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TECHNICAL NOTE

Data acquisition mode available on the BeanDevice®

Beanair® GmbH

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1. TECHNICAL SUPPORT

For general contact, technical support, to report documentation errors and to order manuals, contact ***BeanAir Technical Support Center*** (BTSC) at:
tech-support@beanair.com

For detailed information about where you can buy the BeanAir equipment/software or for recommendations on accessories and components visit:

www.beanair.com

To register for product news and announcements or for product questions contact BeanAir's Technical Support Center (BTSC).

Our aim is to make this user manual as helpful as possible. Please keep us informed of your comments and suggestions for improvements. BeanAir appreciates feedback from the users.

2. VISUAL SYMBOLS DEFINITION

Visual	*Definition*
	***Caution or Warning** – Alerts the user with important information about BeanAir wireless sensor networks (WSN), if this information is not followed, the equipment /software may fail or malfunction.*
	***Danger** – This information MUST be followed if not you may damage the equipment permanently or bodily injury may occur.*
	***Tip or Information** – Provides advice and suggestions that may be useful when installing BeanAir Wireless Sensor Networks.*

3. ACRONYMS AND ABBREVIATIONS

AES	Advanced Encryption Standard
CCA	Clear Channel Assessment
CSMA/CA	Carrier Sense Multiple Access/Collision Avoidance
GTS	Guaranteed Time-Slot
kSPS	Kilo samples per second
LLC	Logical Link Control
LQI	Link quality indicator
LDCDA	Low duty cycle data acquisition
MAC	Media Access Control
PAN	Personal Area Network
PER	Packet error rate
RF	Radio Frequency
SD	Secure Digital
SPS	Samples per second
SSD	Smart shock detection
WSN	Wireless sensor Network

4. RELATED DOCUMENTS & VIDEOS

In addition to this technical note, please consult the related application notes, technical notes and videos:

4.1 APPLICATIONS NOTES

Document name (Click on the weblink)	Related product	Description
AN_RF_007 :" Beanair_WSN_Deployment"	All BeanAir products	Wireless sensor networks deployment guidelines
AN_RF_006 – „How to extend your wireless range"	All BeanAir products	A guideline very useful for extending your wireless range
AN_RF_005 – BeanGateway® & Data Terminal Equipment Interface	BeanGateway®	DTE interface Architecture on the BeanGateway®
AN_RF_004 – "Coexistence And Interferences@2.4GHz"	All BeanAir products	Coexistence & interferences of different RF technologies in the 2.4 GHz frequencies band.
AN_RF_003 - "IEEE 802.15.4 2.4 GHz Vs 868 MHz"	All BeanAir products	Comparison between 868 MHz frequency band and a 2.4 GHz frequency band.
AN_RF_002 – "Structural Health monitoring on bridges"	All BeanAir products	The aim of this document is to overview Beanair® products suited for bridge monitoring, their deployment, as well as their capacity and limits by overviewing various data acquisition modes available on each BeanDevice®.

4.2 TECHNICAL NOTES

Document name (Click on the weblink)	Related product	Description
TN_RF_013 – « OPC configuration »	BeanScape® Premium+	The aim of this document is to help deploying the OPC DA and all associated services.

TN_RF_012– « BeanDevice® autonomy in streaming and streaming packet modes »	All the products	The aim of this document is to describe the autonomy performance of the BeanDevice® SmartSensor® and ProcessSensor® product line in streaming and streaming packet mode.
TN_RF_011 – « Coexistence of Beanair WSN at 2.4GHz »	All the products	This document aims to highlight the issues affecting co-existence of Beanair WSN (IEEE 802.15.4) in the presence of interference.
TN_RF_010 – « BeanDevice® Power Management »	All the BeanDevice®	This technical note describes the sleeping & active power mode on the BeanDevice®.
TN_RF_009 – « BeanGateway® management on LAN infrastructure »	BeanGateway®	BeanGateway® integration on a LAN infrastructure
TN_RF_008 – "Data acquisition modes available on the BeanDevice®"	All the BeanDevice®	Data acquisition modes available on the BeanDevice®
TN_RF_007 – "BeanDevice® DataLogger User Guide "	All the BeanDevice®	This document presents the DataLogger feature on the BeanDevice®
TN_RF_006 – "WSN Association process"	All the BeanDevice®	Description of the BeanDevice® network association
TN_RF_005 – "Pulse counter & binary data acquisition on the BeanDevice® SUN-BN"	BeanDevice® SUN-BN	This document presents Pulse counter (ex: energy metering application) and binary data acquisition features on the BeanDevice® SUN-BN.
TN_RF_004 - Ambient Light sensor technical specifications	BeanDevice® SUN-XX (Ecosensor)	Technical description of the Ambient light sensor available on the BeanDevice® SUN-XX products
RF_TN_003- "Aggregation capacity of wireless sensor networks"	All the products	Network capacity characterization of Beanair Wireless Sensor Networks
RF_TN_002 V1.0 - Current consumption in active & sleeping mode	BeanDevice®	Current consumption estimation of the BeanDevice in active and sleeping mode
RF_TN_001 V1.0- Wireless range benchmarking	BeanDevice®	Wireless range benchmarking of the BeanDevice®

4.3 RELATED VIDEOS

All the videos are available on our Youtube channel

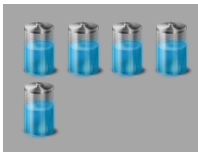
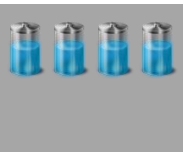
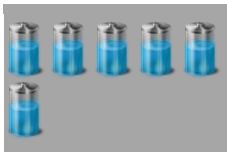
Beanair video link (Youtube)	Related products
Company Presentation	All
BeanGateway® - Ethernet Outdoor version introduction	BeanGateway® - Ethernet Outdoor version introduction
BeanGateway® – Ethernet Indoor version presentation	BeanGateway® Ethernet Indoor version
Beandevice® AN-XX wireless range demonstration	BeanDevice® AN-XX & Beandevice® AN-XX Extender
BeanDevice® AN-XX presentation	BeanDevice® AN-XX & Beandevice® AN-XX Extender
BeanDevice® AX-3D presentation	BeanDevice® AX-3D
BeanDevice® HI-INC presentation	BeanDevice® HI-INC
BeanDevice® AX-3DS presentation	BeanDevice® AX-3DS
BeanScape® – WSN supervision software	BeanScape®
BeanGateway® Ethernet/LAN Configuration, directly connected to the Laptop/PC	BeanGateway®
Performing an energy scan on your BeanGateway®	BeanGateway®
Automatic RF Channel selection	BeanGateway®
Wireless sensors profile deletion from the BeanGateway® Database	All
Network Diagnostic configuration on the BeanGateway®	BeanGateway®
RF Power configuration on the BeanGateway®	BeanGateway®

5. AIM OF THE DOCUMENT

This document is intended to describe the different data acquisition mode available on the BeanDevice®, how to configure these features from the BeanScape® and systems restrictions.

6. ADVANTAGES & LIMITS OF EACH DATA ACQUISITION MODE

The following table presents the advantages & limits of the different data acquisition mode:

	Low Duty Cycle	Alarm	Streaming & Streaming packet	Survey	Smart Shock Detection
Wireless Stack compatibility	*IEEE 802.15.4*				
Low consumption					
Low Duty Cycle	*1s to 1day*				
Data sampling	*N.A.*		*1 sps to 3 Ksps maximum*	*N.A.*	*1 sps to 1 Ksps maximum*
Data acquisition type	*Static*	*Static*	*Dynamic*	*Static*	*Dynamic / static*
Class of application	*Static measurement with sleeping mode*	*Monitoring on remote sites (lack of external power supply)*	*Dynamic measurement : Vibration, acceleration, strain gauge*	*Monitoring on remote sites (lack of external power supply) with a better robustness of the solution*	*Shock detection (BeanDevice® AX-3DS only)*
Network Size					

7. DATA ACQUISITION MODE AVAILABLE ON THE BEANDEVICE®

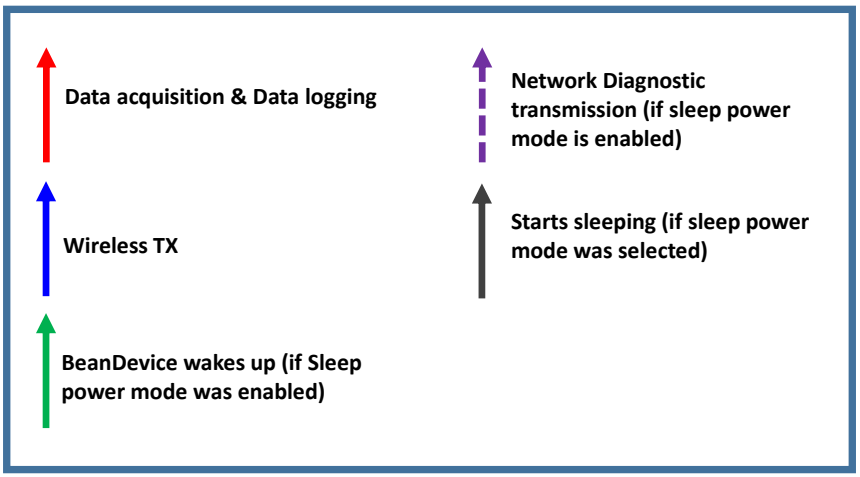
The following table presents the different data acquisition mode available on the BeanDevice®:

Data acquisition Mode	*BeanDevice® ONE-T/ONE-BN/ONE-TH/ONE-TIR (Ecosensor products)*	*BeanDevice® AX-3D/AX-3D Xrange*	*BeanDevice® INC/HI-INC/HI-INC Xrange (Xtend version not included)*	*BeanDevice® INC/HI-INC/HI-INC Xrange (Xtend version)*	*BeanDevice® AN-420/AN-V/AN-mV (Xtender version not included)*	*BeanDevice® AN-420/AN-V/AN-mV (Xtender version)*	*BeanDevice® AX-3DS*
Low Duty Cycle Data Acquisition(LDCDA)	✓	✓	✓	✓	✓	✓	✓
Alarm	✓		✓	✓	✓	✓	
Survey	✓		✓	✓	✓	✓	
Streaming & Streaming Packet		✓	✓		✓		✓
Smart shock detection							✓
Commissioning mode		✓	✓		✓		

8. SYSTEM OVERVIEW

8.1 CAPTIONS

Captions


Data acquisition & Data logging
Wireless TX
BeanDevice wakes up (if Sleep power mode was enabled)
Network Diagnostic transmission (if sleep power mode is enabled)
Starts sleeping (if sleep power mode was selected)

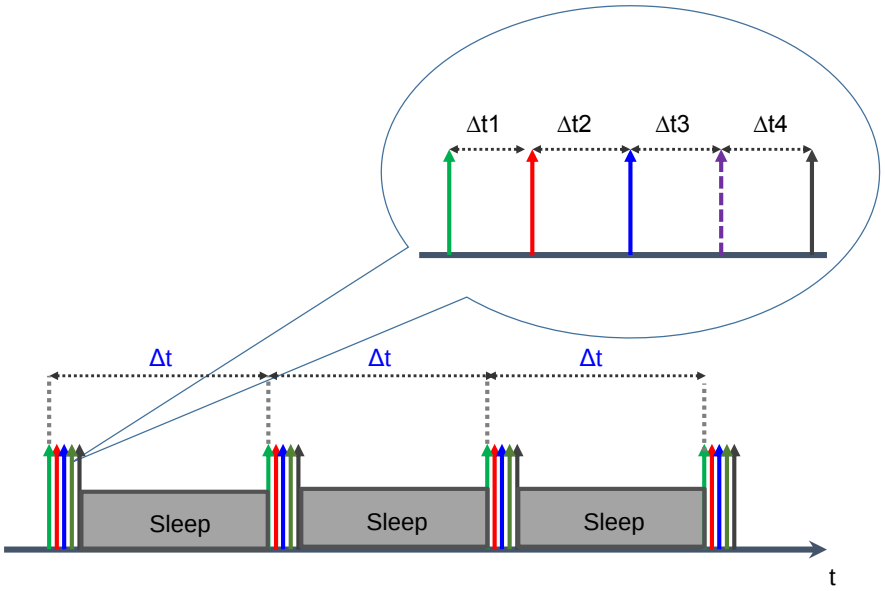
8.2 LOW DUTY CYCLE DATA ACQUISITION (LDCDA)

8.2.1 Process Description

LDCDA is suitable for static measurement (tilt, pressure, temperature….) requiring a low power operation on your BeanDevice®.

Measurement duty cycle can be configured between one data acquisition & transmission per second to 1 data acquisition & transmission per day.

Low Duty Cycle Data Acquisition Mode



In Low Duty cycle data acquisition (LDCDA), the BeanDevice® operates as follows:

- ✓ ***Step 1*** *: A Data acquisition is performed;*
- ✓ ***Step 2****: **If Datalogger feature is enabled**: the data acquisition is registered on the Beandevice® data logger ;*
- ✓ ***Step 3****: **If "Wireless transmission" option is enabled**: the data acquisition is transmitted to the **BeanGateway®** ;*
- ✓ ***Step 4****: A Network diagnostic is performed and transmitted to the **BeanGateway®** (depending on the diagnostic cycle defined by the user)*
- ✓ ***Step 5*** *: The **BeanDevice®*** goes to sleep *(if "sleep" or "sleep with network listening" power mode is enabled)*

Go to the LDCDA Flowchart diagram section for a flowchart representation of the LDCDA data acquisition mode.

8.2.2 Data acquisition cycle

Data acquisition cycle is user-definable from the ***BeanScape®***, it includes a series of protection mechanisms against unauthorized configurations:

Data Acquisition cycle (depending on the power mode status)		*Data acquisition duty cycle (in seconds)*
Minimum values	The BeanDevice® is operating with "Sleep power mode" or "Sleep power mode with network listening"	*4s*
	The BeanDevice® is operating with "Active" power mode	*1s*
Maximum value		*1day (86400 seconds)*

If a short data acquisition cycle is configured, the battery life will decrease rapidly. For a better battery life, make sure that its power mode is configured in "sleep mode" or "sleep mode with network listening".

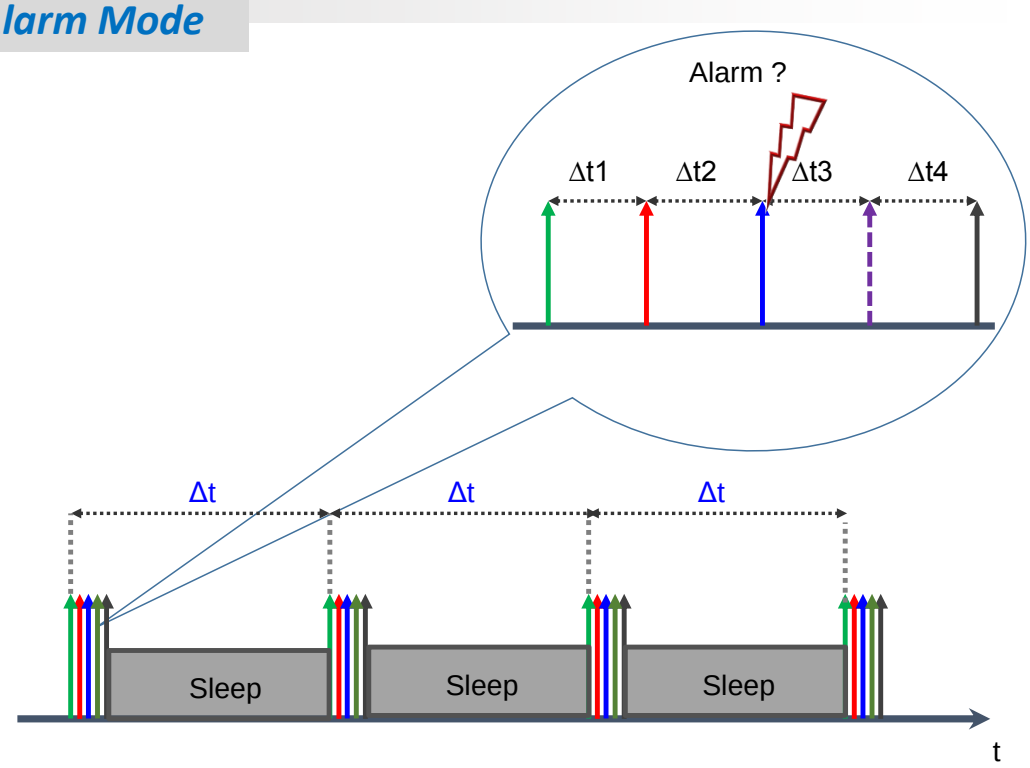
For further information about the power mode on the BeanDevice®, please read the following technical note TN_RF_010 – « BeanDevice® Power Management »

8.3 ALARM MODE

8.3.1 Process description

Data acquisition is transmitted by radio whenever an alarm threshold (settled by the user) is reached. Four alarms threshold levels ***High***/***Low*** are dedicated to each sensor channel.

Alarm Mode



In alarm mode, the BeanDevice® operates as follows:

- ✓ ***Step 1*** *: A Data acquisition is performed;*
- ✓ ***Step 2****: **If Data Logger option is enabled**: the data acquisition is registered on the Beandevice® Datalogge if an alarm threshold is reached ;*
- ✓ ***Step 3: If "Wireless transmission" option is enabled****: the data acquisition is transmitted to the **BeanGateway®** if an alarm threshold is reached;*
- ✓ ***Step 4 :*** *A Network diagnostic is performed and transmitted to the **BeanGateway®** (depending on diagnostic cycle defined by the user)*
- ✓ ***Step 5*** ***:*** *The **BeanDevice®*** goes to sleep *(if sleep mode/ sleep mode with network listening is selected)*

If the alarm thresholds H1/H2/L1/L2 are not clearly defined, you can end up with spurious and untimely alarms. Do not forget to properly configure the alarms thresholds before

starting the alarm mode. Read the section "Alarm threshold configuration from the BeanScape®".

Go to the Alarm Flowchart diagram section for a flowchart representation of the LDCDA measurement mode.

8.3.1 Data acquisition cycle

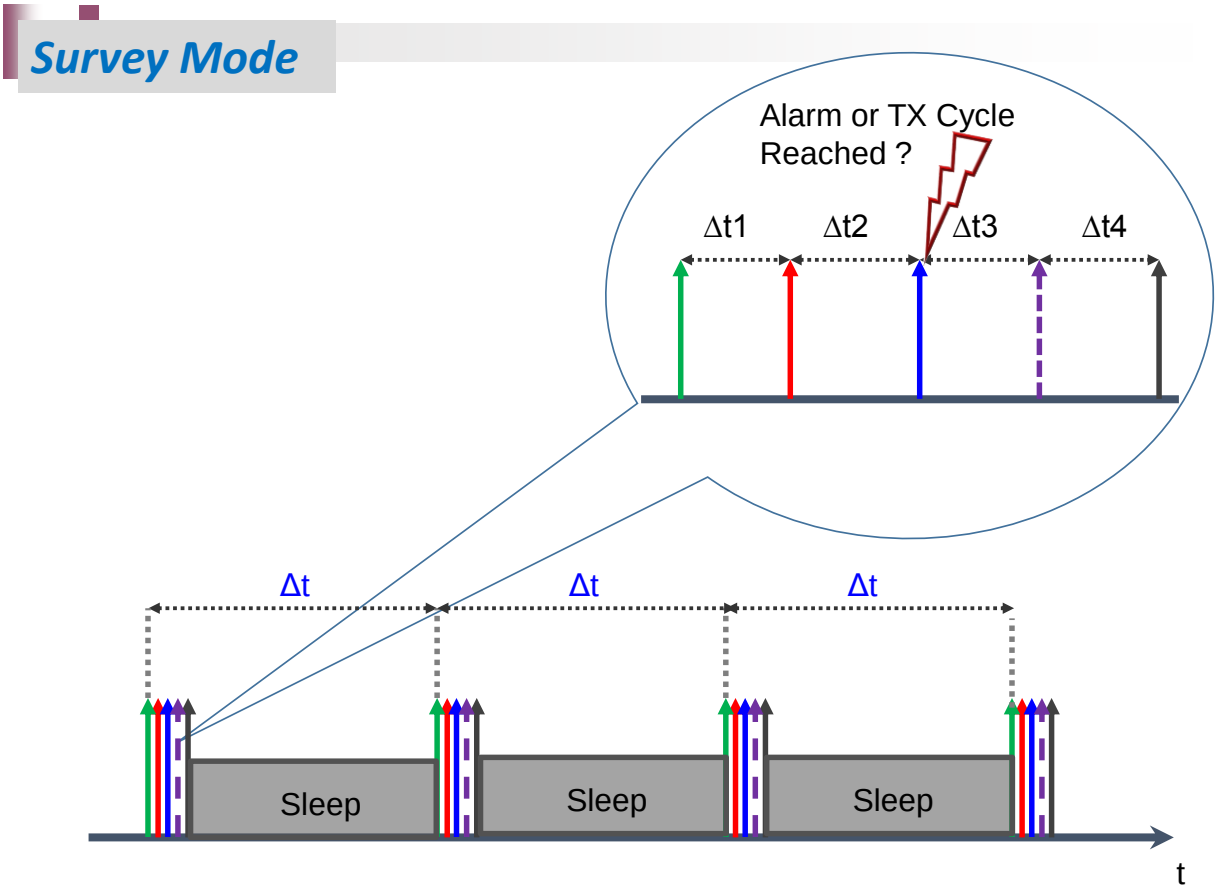
Same process than LDCDA mode.

8.4 « SURVEY » MODE

8.4.1 Process description

The survey mode operates like the alarm mode but the device sends frequently a beacon frame informing its status:

- ✓ Data acquisition is done with a duty cycle of ***Cm*** (configurable with the BeanScape®);
- ✓ Data transmission is done with a duty cycle of ***Ct = N*Cm*** , N is configurable from the BeanScape® supervision software;
- ✓ Whenever an alarm threshold (user-configurable) is reached (4 alarm threshold levels High/Low), an alarm notification is transmitted to the ***BeanGateway®***;



In survey mode, the BeanDevice® operates as follows:

- ✓ ***Step 1*** *: The* ***BeanDevice®*** *wakes up (if sleep mode/ sleep mode with network listening is selected), all the sensors connected to the BeanDevice® are also activated;*
- ✓ ***Step 2*** *: A Data acquisition is performed;*
- ✓ ***Step3****:* ***If the Data logger function is enabled****: the data acquisition is registered on the Beandevice® Data logger if an alarm threshold is reached ®* **or** a measurement cycle is reached;
- ✓ ***Step 4****:* ***If "Wireless transmission" option is enabled****: the data acquisition is transmitted to the* ***BeanGateway®*** *if an alarm threshold is reached* **or** a transmission cycle is reached*;*
- ✓ ***Step 5*** *: A Network diagnostic is performed and transmitted to the* ***BeanGateway®*** *(depending on diagnostic cycle defined by the user);*
- ✓ ***Step 6*** *: The* ***BeanDevice®*** goes to sleep *(if sleep mode/ sleep mode with network listening is selected);*

If the alarms thresholds H1/H2/L1/L2 are not well defined, you can end up with spurious and untimely alarms. Do not forget to properly configure the alarms thresholds before starting the alarm mode. Read the section "Alarm threshold configuration from the BeanScape®".

Go to the Flowchart diagram section for a flowchart representation of the LDCDA measurement mode.

8.4.2 Data acquisition cycle

Same process than LDCDA mode

8.5 STREAMING & STREAMING PACKET MODE

8.5.1 Process description

Streaming & Streaming Packet mode are dedicated to dynamic data acquisition (vibration, strain gage, deformation, acceleration…):

- ✓ ***"Streaming Packet"*** is more suitable for users requiring a high data sampling rate (maximum sampling rate is 3 KSps). In order to achieve these performances, data sampling are transmitted by packet;
- ✓ ***"Streaming"*** is more suitable for users requiring a real-time data transmission (with a time response under 10ms).

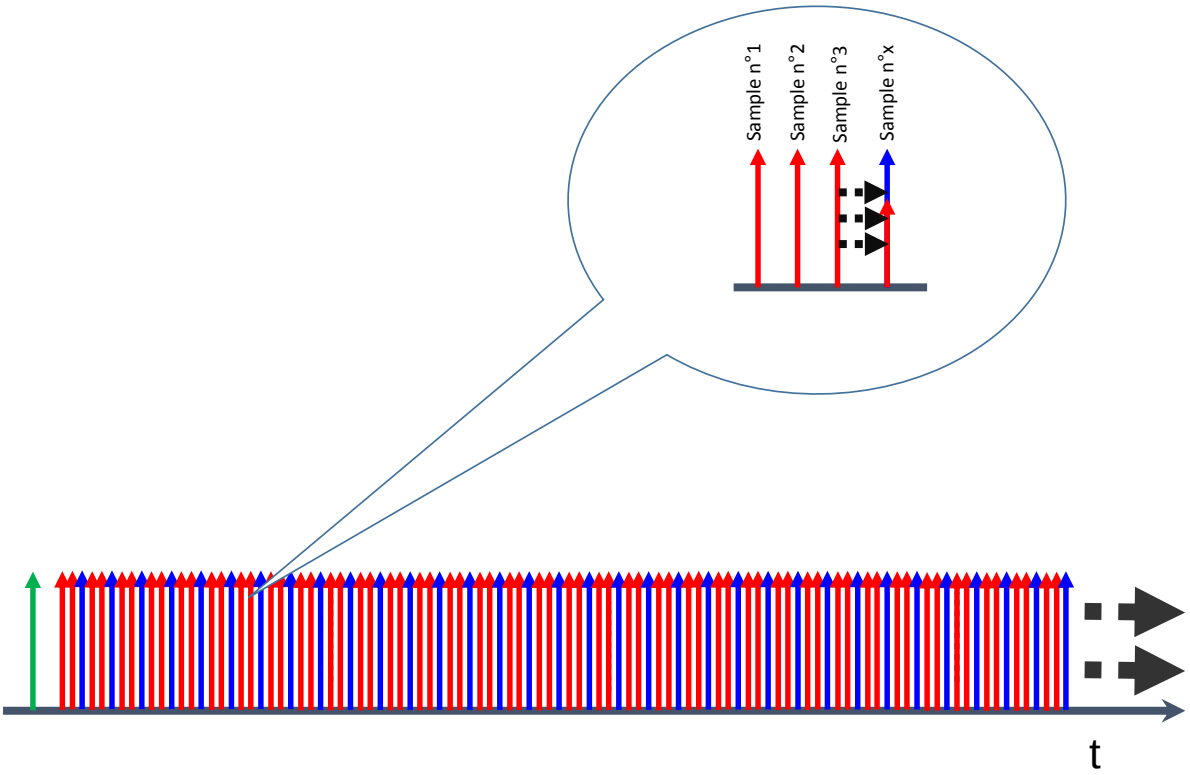
Sampling rate value depends highly on the number of sensor channels activated.

For completing this type of data acquisition, the BeanDevice® provides others options:

- ✓ ***« Continuous monitoring » option***: data acquisition is transmitted to the ***Beangateway®*** in a continuous flow rate. This mode is adapted for continuous monitoring on machines.
- ✓ ***« Burst » option***: data acquisition is transmitted to the ***Beangateway®*** in a burst flow rate
- ✓ ***« One Shot » option***: data acquisition is transmitted to the ***BeanGateway®*** during a period time , then the ***BeanDevice®*** enters into commissioning mode

8.5.1.1 Streaming Packet with "**continuous monitoring**" option

Streaming packet mode with « continuous monitoring » option

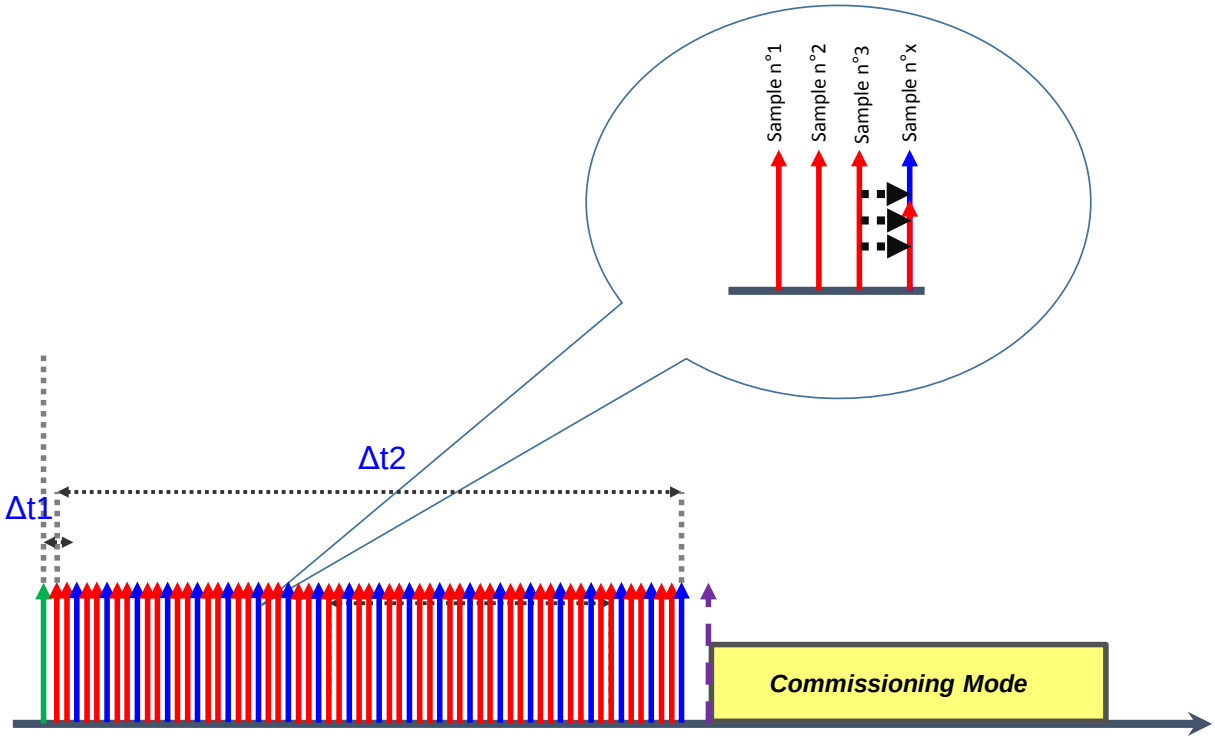


The BeanDevice® operates as follows:

- ✓ ***Step 1*** *: A Data acquisition is performed with a high sampling rate, and buffered ;*
- ✓ ***Step 2****: If Data logger function is enabled: the data acquisition is backed up on the Beandevice® data logger*;
- ✓ ***Step 3: If "Wireless transmission" option is enabled****:* If data buffer is full, a data packet is transmitted to the ***BeanGateway® ;***
- ✓ ***Step 4****:* Step 1 to Step 3 are repeated without stopping;

8.5.1.2 Streaming packet mode with "One shot" option

Streaming packet mode with « One Shot » option

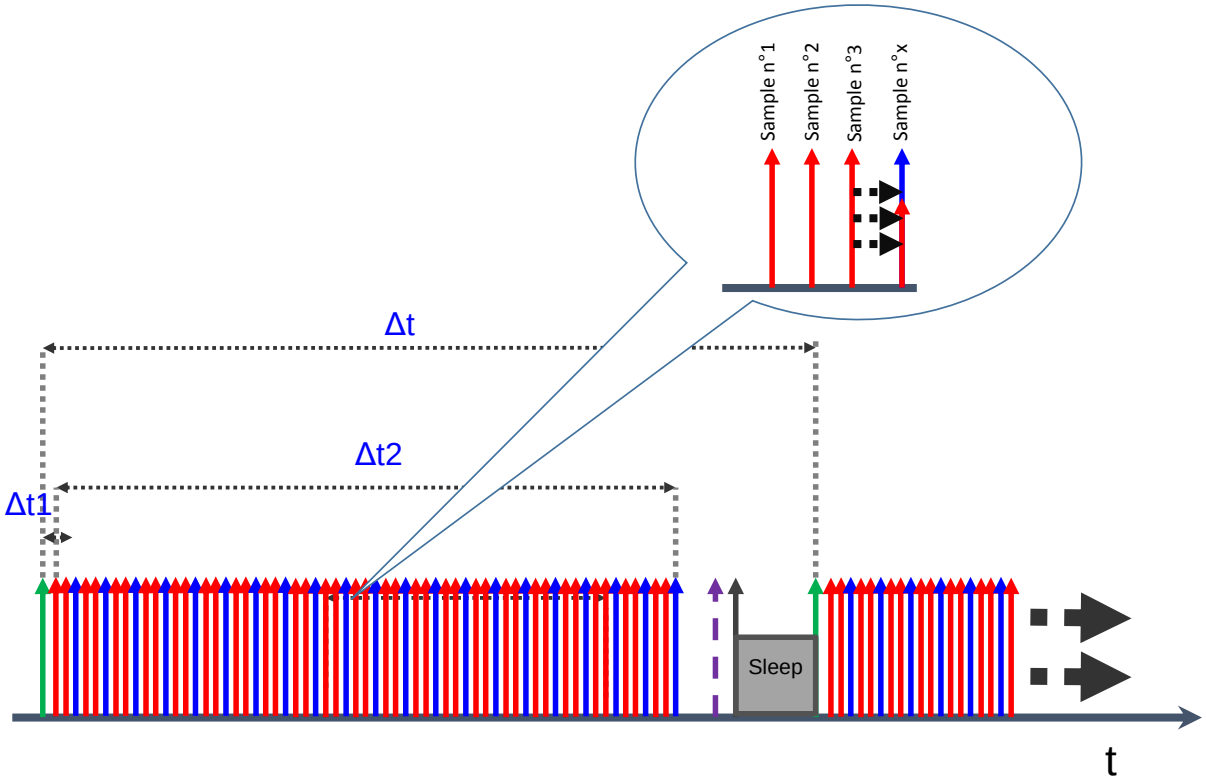


The BeanDevice® operates as follows:

- ✓ ***Step 1*** *: A data acquisition is performed with a high sampling rate, and buffered ;*
- ✓ ***Step 2****: If "data logger" option is enabled: the data acquisition is backed up on the Beandevice® data logger*;
- ✓ ***Step 3: If "Wireless transmission" option is enabled****:* If data buffer is full, a data packet is transmitted to the ***BeanGateway® ;***
- ✓ ***Step 4****: **Step 1*** to ***Step 3*** are repeated until the sampling duration is completed;
- ✓ ***Step 5*** *: A Network diagnostic is performed and transmitted to the* ***BeanGateway®*** *(depending on diagnostic cycle defined by the user)*
- ✓ ***Step 6****: The* ***BeanDevice®*** goes to "***Commissioning mode***", and will wait for a new OTAC request;

8.5.1.3 Streaming packet mode with "Burst" option

Streaming Packet Mode with « burst » option

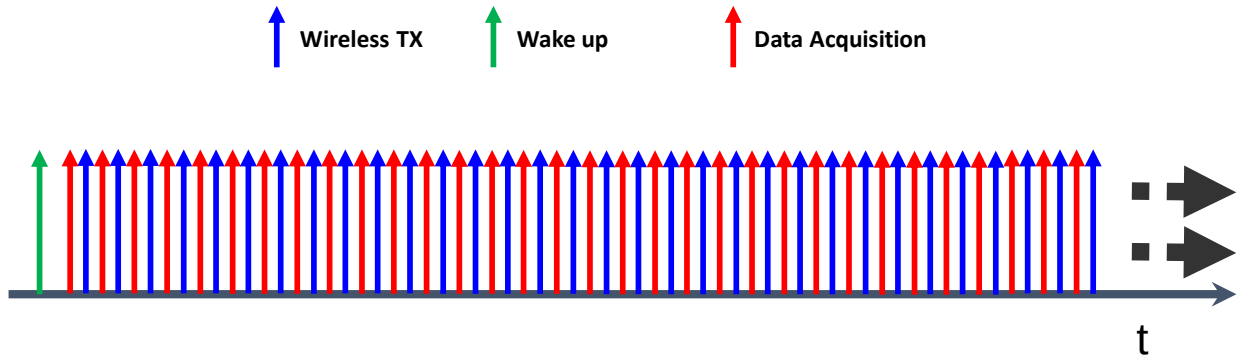


The BeanDevice® operates as follows:

- ✓ ***Step 1*** *: A data acquisition is performed with a high sampling rate, and then buffered ;*
- ✓ ***Step 2****: If data logger option is enabled: the data acquisition is backed up on the Beandevice® Data logger*;
- ✓ ***Step 3: If "Wireless transmission" option is enabled****:* If data buffer is full, a data packet is transmitted to the ***BeanGateway®*** ;
- ✓ ***Step 4****:* ***Step 1*** to ***Step 3*** are repeated until the sampling duration is completed;
- ✓ ***Step 5*** *: A Network diagnostic is performed and transmitted to the* ***BeanGateway®*** *(depending on diagnostic cycle defined by the user);*
- ✓ ***Step 6*** *: The* ***BeanDevice®*** goes to sleep power mode *(if sleep mode/ sleep with network listening powe mode is enabled);*

8.5.1.4 Streaming mode with "**Continuous monitoring**" option

Streaming Mode with « continuous monitoring » option enabled

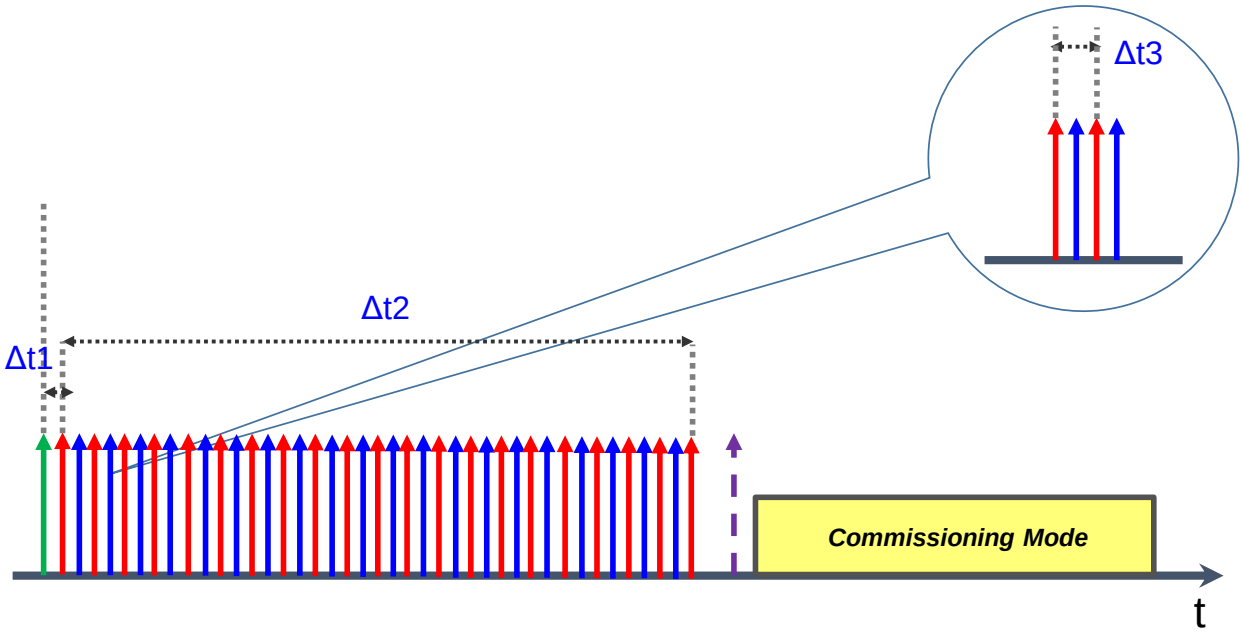


In Streaming Packet mode (continuous monitoring), the BeanDevice® operates as follows:

- ✓ ***Step 1*** *: A Data acquisition is performed with a high sampling rate ;*
- ✓ ***Step 2****: If data logger option is enabled: the data acquisition is registered on the Beandevice® data logger;*
- ✓ ***Step 3: If "Wireless transmission" option is enabled:*** Data acquisition is transmitted instantly to the ***BeanGateway® ;***
- ✓ ***Step 4****:* Step 1 to Step 3 are repeated without stopping;

8.5.1.5 Streaming mode with "one shot" option

Streaming Mode with « one shot » option



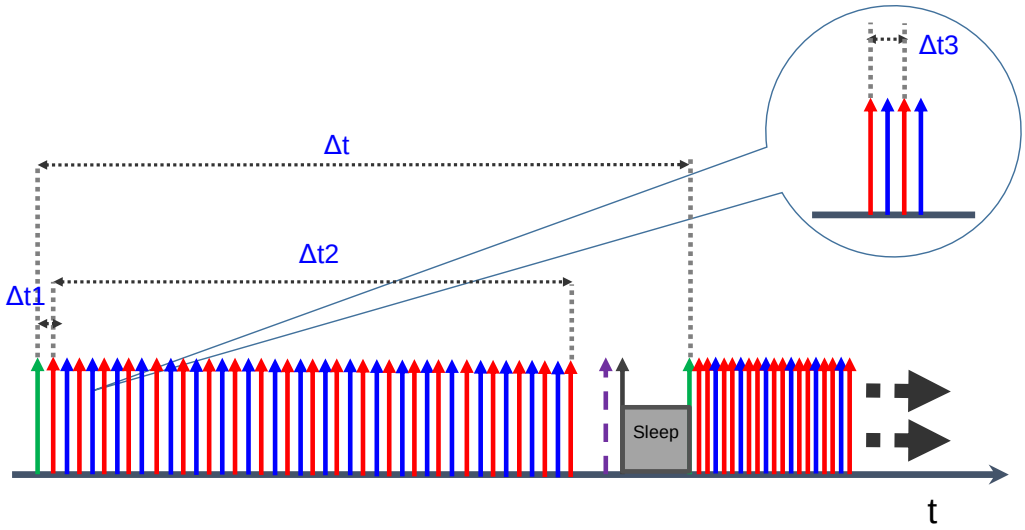
The BeanDevice® operates as follows:

- ✓ ***Step 1*** *: A data acquisition is performed with a high sampling rate, and buffered ;*
- ✓ ***Step 2****: If "data logger" option is enabled: the data acquisition is backed up on the Beandevice® data logger*;
- ✓ ***Step 3: If "Wireless transmission" option is enabled****:* Data acquisition is transmitted instantly to the ***BeanGateway® ;***
- ✓ ***Step 4****: **Step 1*** to ***Step 3*** are repeated until the sampling duration is completed;
- ✓ ***Step 5*** *: A Network diagnostic is performed and transmitted to the **BeanGateway®** (depending on diagnostic cycle defined by the user)*

- ✓ ***Step 6**: The **BeanDevice®** goes to "**Commissioning mode**", and will wait for a new OTAC request;*

8.5.1.6 Streaming mode with "Burst" option

Streaming Mode with « burst » option enabled



The BeanDevice® operates as follows:

- ✓ ***Step 1** : A data acquisition is performed with a high sampling rate, and then buffered ;*
- ✓ ***Step 2**: **If data logger option is enabled**: the data acquisition is backed up on the Beandevice® Data logger*;
- ✓ ***Step 3: If "Wireless transmission" option is enabled**:* Data acquisition is transmitted instantly to the ***BeanGateway® ;***
- ✓ ***Step 4**: **Step 1** to **Step 3** are repeated until the sampling duration is completed;*
- ✓ ***Step 5** : A Network diagnostic is performed and transmitted to the **BeanGateway®** (depending on diagnostic cycle defined by the user);*

- ✓ ***Step 6** : The **BeanDevice®** goes to sleep power mode (if sleep mode/ sleep with network listening powe mode is enabled);*

8.5.2 Maximum sampling rate

The following table describes the maximum sampling rate depending on the number of sensor channels activated.

BeanDevice® Model		BeanDevice® AX-3D		BeanDevice® AX-3D XRange		BeanDevice® HI-INC & INC & HI-INC Xrange		BeanDevice® AX-3DS		BeanDevice® AN-V/AN-mV/AN-420	
Data Acquisition mode		Streaming Packet mode	Streaming mode	Streaming Packet mode	Streaming mode	Streaming Packet mode	Streaming mode	Streaming Packet mode	Streaming mode	Streaming Packet mode	Streaming mode
Number of enabled DAQ /Sensor channel	*1 Channel*	3 KSPS	100 SPS	3 KSPS	100 SPS	60 SPS	60 SPS	1 KSPS	100 SPS	400 SPS	100 SPS
	2 Channels	1,5 KSPS	100 SPS	1,5 KSPS	100 SPS	60 SPS	60 SPS	1 KSPS	100 SPS	400 SPS	100 SPS
	3 Channels	1 KSPS	100 SPS	1 KSPS	100 SPS	60 SPS	60 SPS	1 KSPS	100 SPS	400 SPS	100 SPS
	4 Channels	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	400 SPS	100 SPS

Take notice: 1 KSPS == 1Ksamples per second with a resolution of 16-bits

The WSN comes with the following restrictions:

- ✓ ***Data acquisition duration must be lower than data acquisition cycle. The BeanDevice® settles a margin of 10s between these two parameters.***

In Streaming & Streaming Packet mode: PER (Packet Error Rate) will increase proportionately with the sampling rate, mainly if several BeanDevice® are connected on the same WSN. It is highly recommended to test several WSN topologies in order to find the right suitability between the WSN size and the sampling rate. For further information, read the technical note: RF_TN_003- "Aggregation capacity of wireless sensor networks"

Due to sampling rate synchronization constraint, an OTAC (Over-the-air-configuration) will not be possible when Streaming Packet/Streaming is started. Be sure that your BeanDevice®

configuration is correct before starting the streaming/streaming packet mode. In the case of a wrong configuration, read the section "Restrictions in streaming & streaming packet mode".

Go to the Streaming Flowchart diagram section for a flowchart representation of the LDCDA measurement mode.

Go to the Streaming Packet Flowchart diagram section for a flowchart representation of the LDCDA measurement mode.

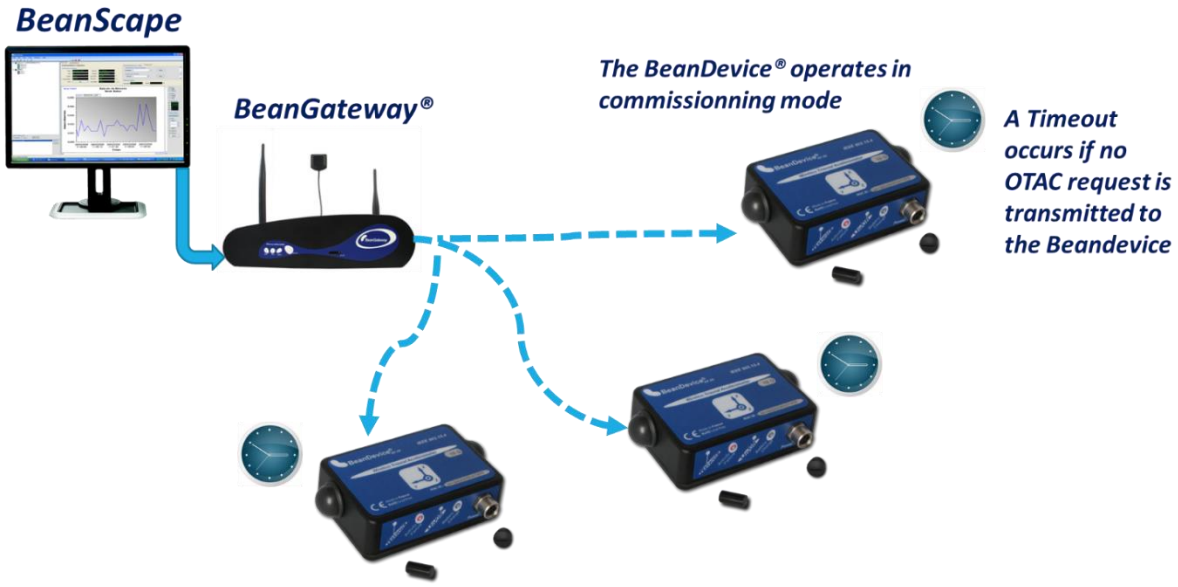
8.6 COMMISSIONING MODE

8.6.1 Description

Commissioning mode allows the user to start a data acquisition on request.

During commissioning mode, the BeanDevice® will wait for new OTAC request transmitted by the BenGateway®:

- No data acquisition is performed;
- The Beandevice® is operating in active power mode;


BeanScape
BeanGateway®
The BeanDevice® operates in commissionning mode
A Timeout occurs if no OTAC request is transmitted to the Beandevice

Commissioning mode comes with several restrictions:

- ✓ ***The BeanDevice® is always active (sleeping/sleeping with network listening are not authorized)***
- ✓ ***The Beandevice® cannot accept an OTAC request linked to a Power mode update;***
- ✓ ***A Timeout occurs if any OTAC request is received during the Commissioning mode, then the BeanDevice® switches to "Standby power Mode". This Timeout is user-configurable with a default value of 10 minutes and a range of [1minute to 60 minutes]***

8.7 SMART SHOCK DETECTION (AVAILABLE ONLY ON THE BEANDEVICE® AX-3DS)

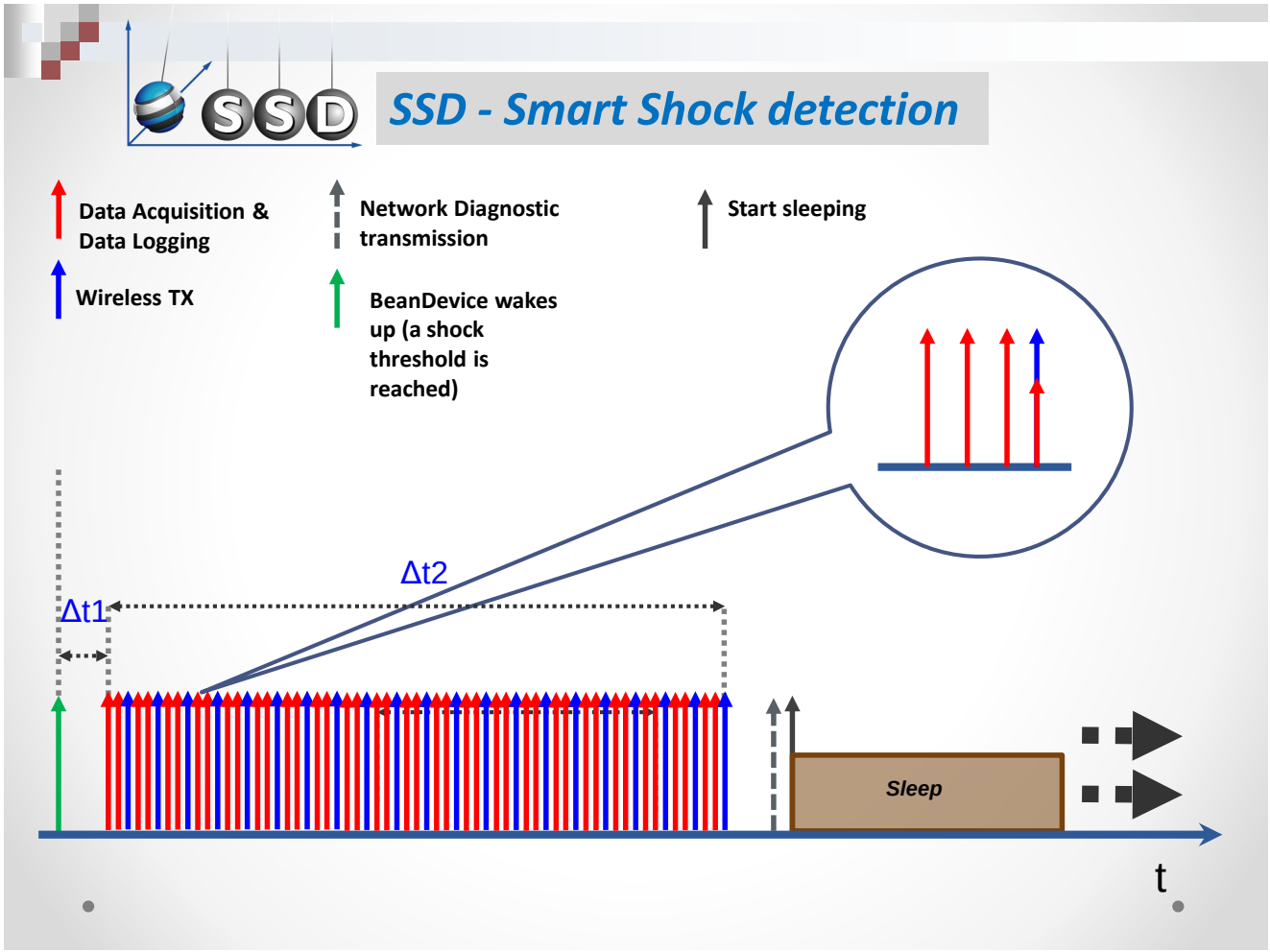
8.7.1 Description

The BeanDevice® AX-3DS integrates ***Smart Shock Detection*** technology which permits to detect & recognize a shock event during the sleeping mode of the ***BeanDevice® AX-3DS.***

The BeanDevice® wakes up on two conditions:

- ***Survey Cycle***: A survey frame is transmitted; the transmission cycle is configurable from the BeanScape®. The user can choose to enable or disable this option;
- Whenever a shock event is detected, all the measurement data are transmitted instantly;

8.7.2 During a shock detection



Δt1 = 12.5 ms, Latency time between the Beandevice® wakes up and the first data acquisition

Δt2 **-** Data sampling duration. This value can be configured by the user from the BeanScape® software.

The BeanDevice® operates as follows:

- ✓ ***Step 1*** *: A shock threshold is reached (user-configurable), the* ***BeanDevice®*** *wakes up;*
- ✓ ***Step 2*** *: A Data acquisition is performed with a high sampling rate, and buffered ;*
- ✓ ***Step3*****: If DataLogger feature is enabled**: the data acquisition is registered on the Beandevice® Datalogger;
- ✓ ***Step 4: If a Data Transmission feature is enabled:*** The data acquisition is transmitted to the ***BeanGateway® ;***
- ✓ ***Step 5***: Step 2 to Step 4 are repeated until the sampling duration (**Δt2**) is completed;

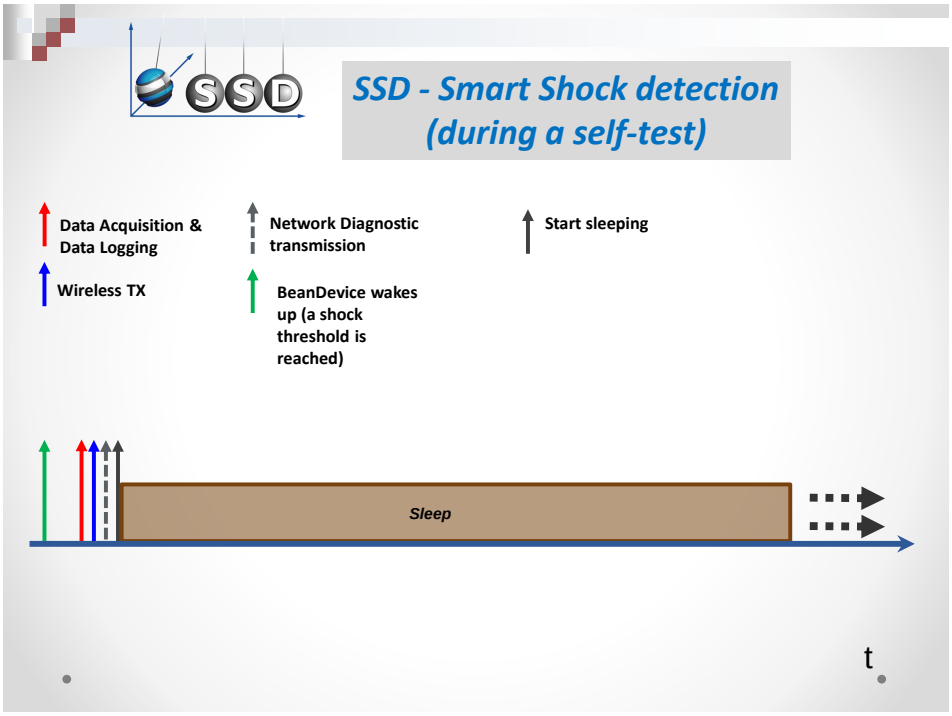
- ✓ ***Step 6**: A Network diagnostic is automatically performed and transmitted to the **BeanGateway®***
- ✓ ***Step 7** : The **BeanDevice®** goes to sleep*

8.7.3 During a Survey

If survey feature is activated, the BeanDevice® wakes up on a duty cycle:

- ✓ ***Step 1** : The **BeanDevice®** wakes up;*
- ✓ ***Step 2** : A Data acquisition is performed ;*
- ✓ ***Step 4:** If a Data Transmission feature is enabled: The data acquisition is transmitted to the **BeanGateway® ;***
- ✓ ***Step 5**: A Network diagnostic is automatically performed and transmitted to the **BeanGateway®***
- ✓ ***Step 6** : The **BeanDevice®** goes to sleep*

The data logger is not activated during a survey



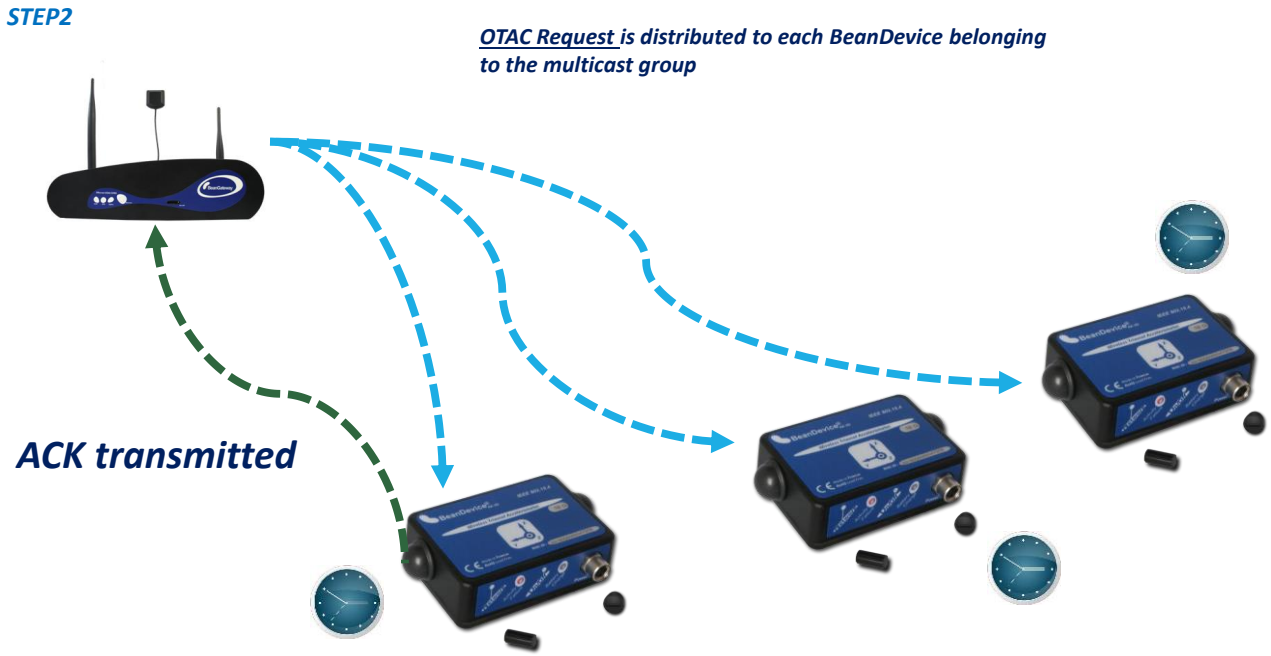
9. SYNCHRONUOUS MULTICAST ROUTING

9.1 OVERVIEW

A synchronous multicast routing enables the delivery of an OTAC request to a set of Beandevice® that have been configured as members of a multicast group within the WSN.

Step1: The BeanScape® transmits to the BeanGateway® a message containing the OTAC request followed by the multicast group;

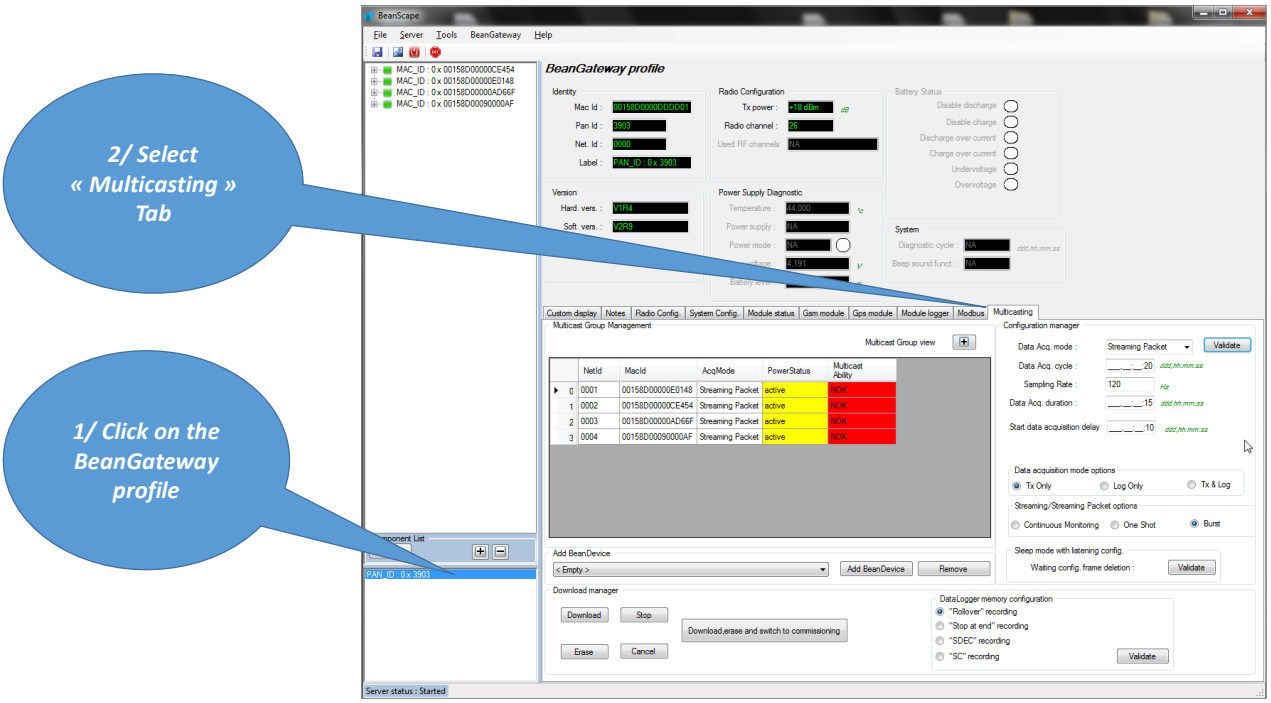
Step2: OTAC request is distributed to each BeanDevice® belonging to the same multicast group. The BeanDevice® sends an ACK (acknowledgment) if the OTAC request is accepted.

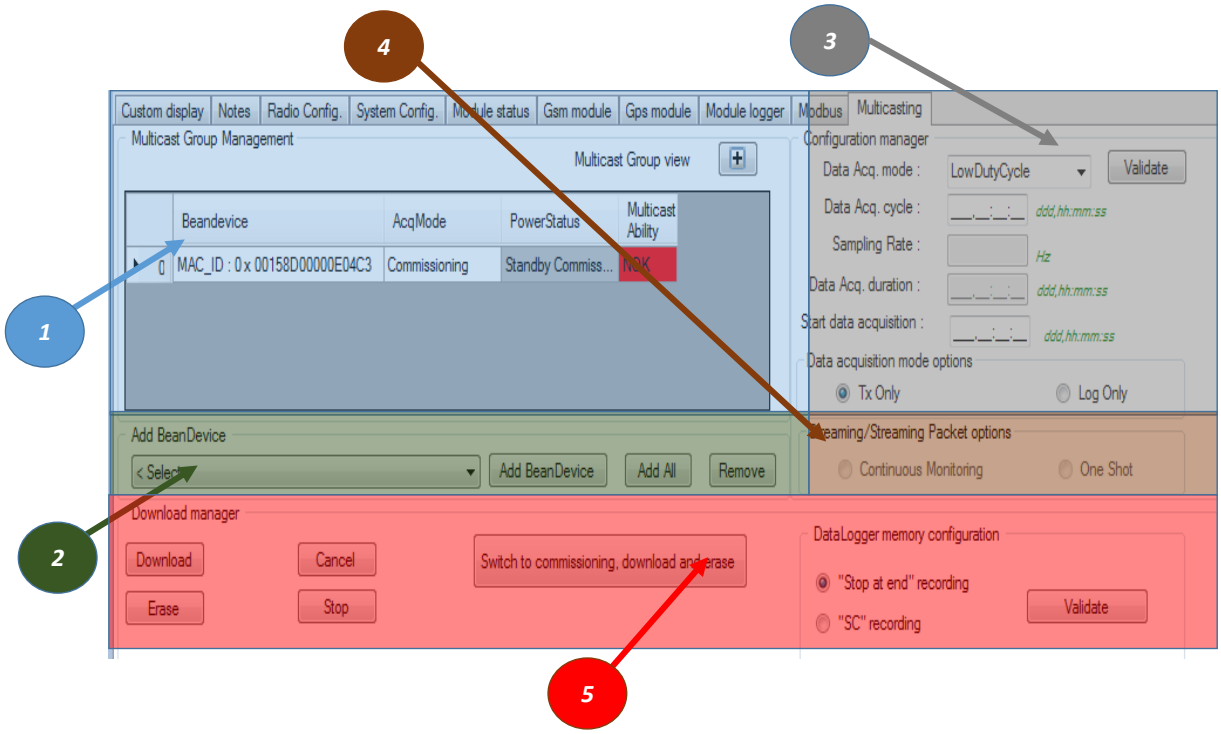


Step 3: If the OTAC request is linked to a data acquisition mode, it will start at the same time for all the BeanDevice® belonging to the same multicast group. The user can configure a starting delay (minimum value 10s). A synchronization accuracy of ***5ms*** is reached over the WSN.

9.2 DESCRIPTION

1. Click on the BeanGateway® profile
2. Select « Multicasting » tab

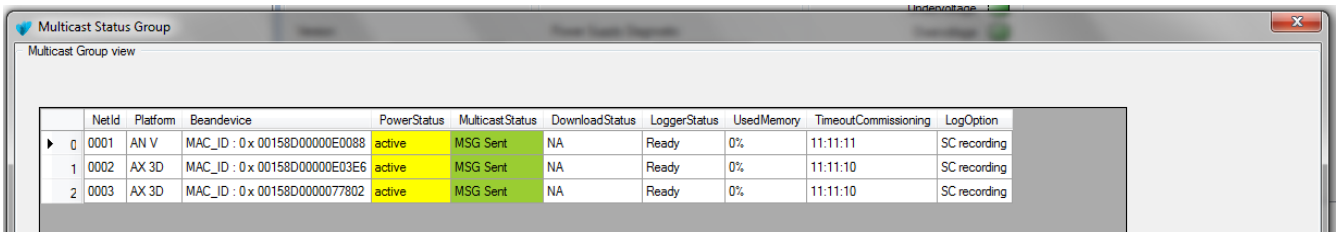




Field	Parameters	Description
Multicast Group management (1)	/	Displays the list of Beandevice® linked to the Multicast Group ✓ ***BeanDevice®*** : Beandevice® MAC ID ✓ ***AcqMode***: Current Data acquisition mode ✓ ***PowerStatus*** : Current Power mode status ✓ ***Multicast Ability***: OK or NOK. If NOK, you have to configure your BeanDevice® into commissioning mode.
Add BeanDevice® (2)	***Select***	Select the Beandevice® from the scroll list
	Add BeanDevice®	Add a Beandevice® to your Multicast group
	Add all	Add all the BeanDevice® to your Multicast group
	Remove	Remove a BeanDevice® from your Multicast group
Configuration Manager (3)	/	Same setting than "Data acquisition mode" configuration Tab available on the Beandevice® profile Click here for more information

		These parameters are dispatched to the Multicast group. The BeanDevice® should be configured in Commissioning mode.
Download manager (5)	***Download***	Same setting than "Datalogger" configuration Tab available on the Beandevice® profile. These parameters are dispatched to the Multicast group.
	Stop	
	Erase	
	Cancel	
	Download , Erase and switch to commissioning	
	Datalogger memory configuration	

By clicking on "***Multicast group view***", a second window will open. It will display the following information:


Multicast Status Group
Multicast Group view
NetId Platform Beandevice PowerStatus MulticastStatus DownloadStatus LoggerStatus UsedMemory TimeoutCommissioning LogOption
0 0001 AN V MAC_ID : 0 x 00158D00000E0088 active MSG Sent NA Ready 0% 11:11:11 SC recording
1 0002 AX 3D MAC_ID : 0 x 00158D00000E03E6 active MSG Sent NA Ready 0% 11:11:10 SC recording
2 0003 AX 3D MAC_ID : 0 x 00158D0000077802 active MSG Sent NA Ready 0% 11:11:10 SC recording

Parameters	***Description***
NetID	Beandevice® Network Address
Platform	BeanDevice® product version
Beandevice®	Beandevice® MAC Address
PowerStatus	BeanDevice® power mode status (Active, Sleep, Sleep with network listening, Standby….)
Multicast Status	Several Multicast status are available (MSG Sent….)
Download Status	Datalogger download status (N.A., Successful)
Logger Status	Datalogger status (Ready….)
UsedMemory	% of used memory on the Datalogger

TimeoutCommissionning	Timeout occurrence value during the commissioning mode
LogOption	Datalogger option (SC recording, ….)

10. OPERATIONAL FEATURES

10.1 ALARM THRESHOLD MANAGEMENT (SURVEY AND ALARM MODE)

This section is related to the alarms threshold management on the BeanDevice®

The BeanDevice® ONE-BN operates with a special alarm threshold management. For further information, please read the technical note.

TN_RF_005: "Pulse counter & binary data acquisition on the BeanDevice® ONE-BN"

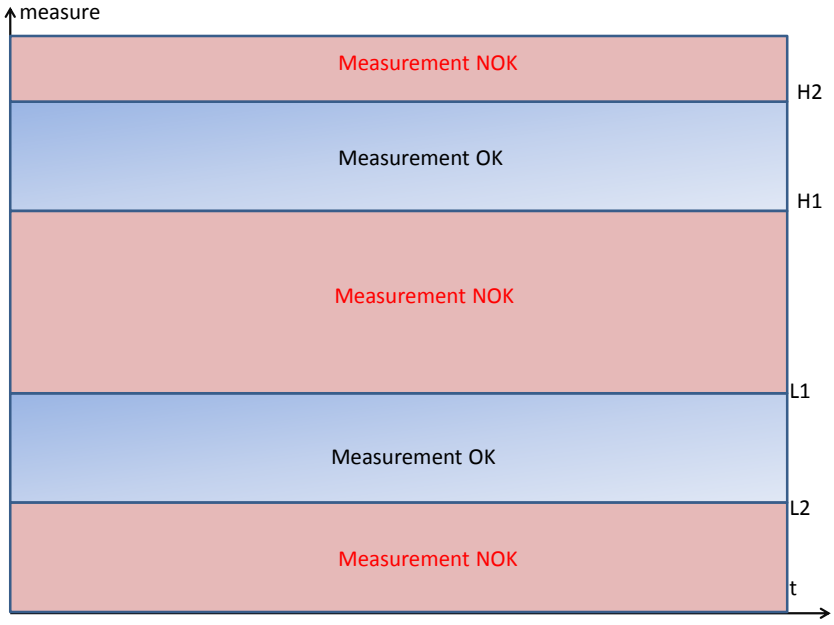
Four alarms thresholds are available. The user can remotely configure the threshold values from the BeanScape ®:

- 2 high thresholds (H1/H2)
- 2 low thresholds (L1/L2)

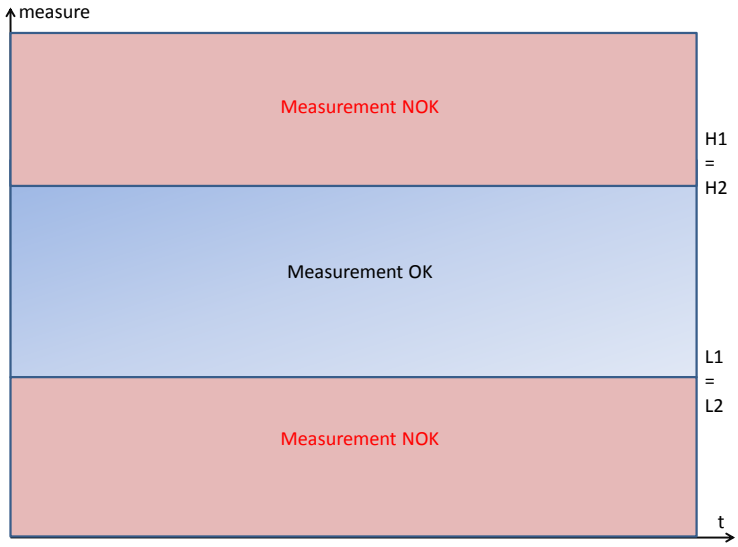
Alarms threshold are organized as follows: ***H2 >= H1 > L1 >= L2***

Several configurations are possible:

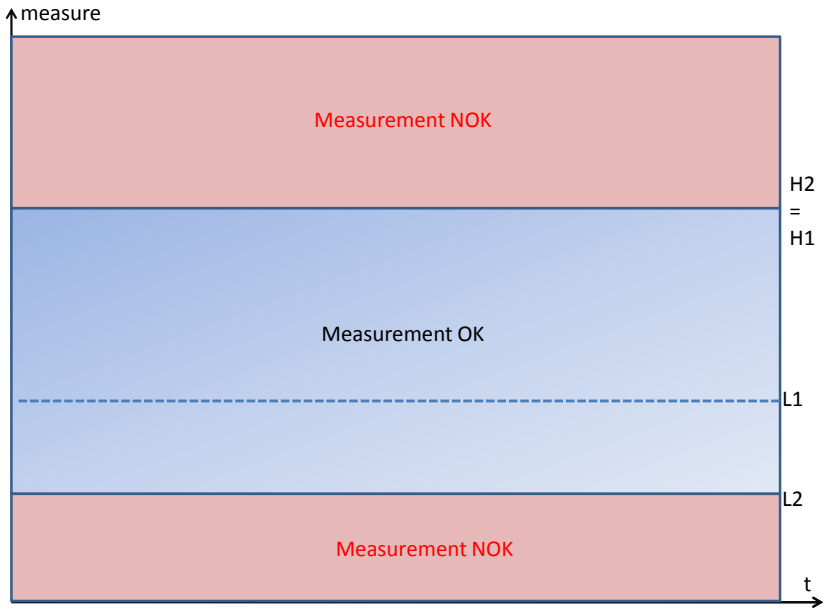
If H2 > H1 & L1> L2



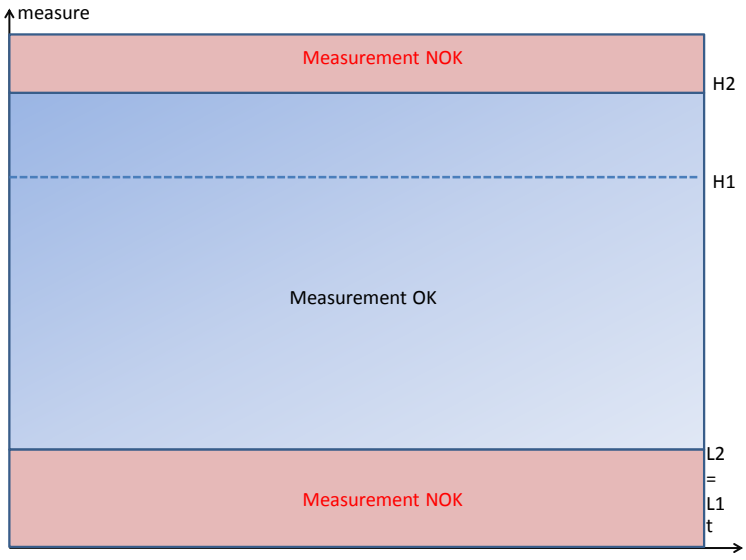
If H2 = H1 & L1=L2



If H2 = H1 and L1 > L2



If H2 > H1 et L1 == L2



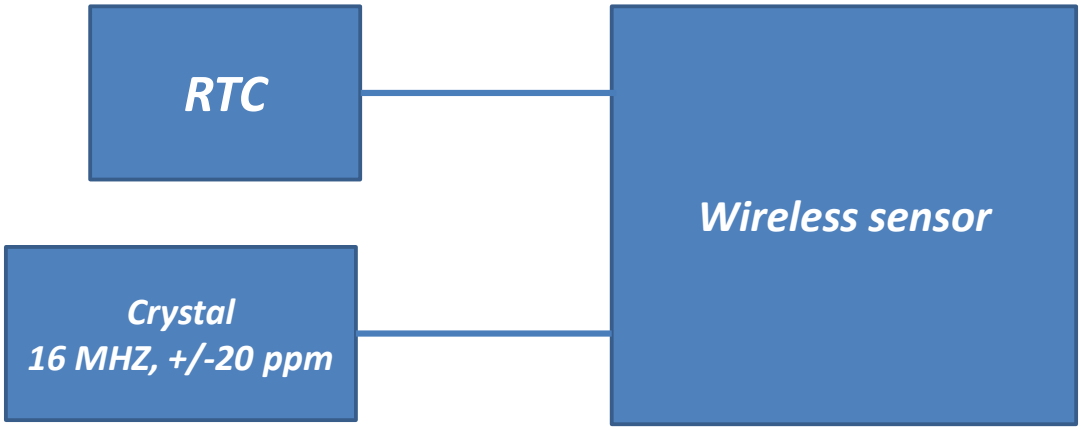
If the alarms thresholds H1/H2/L1/L2 are not well defined, **you can end up with spurious and untimely alarms. Do not forget to properly configure the alarms thresholds before starting the alarm mode.**

10.2 DATA SAMPLING ACCURACY IN STREAMING & STREAMING PACKET MODE (FOR EXPERTS ONLY)

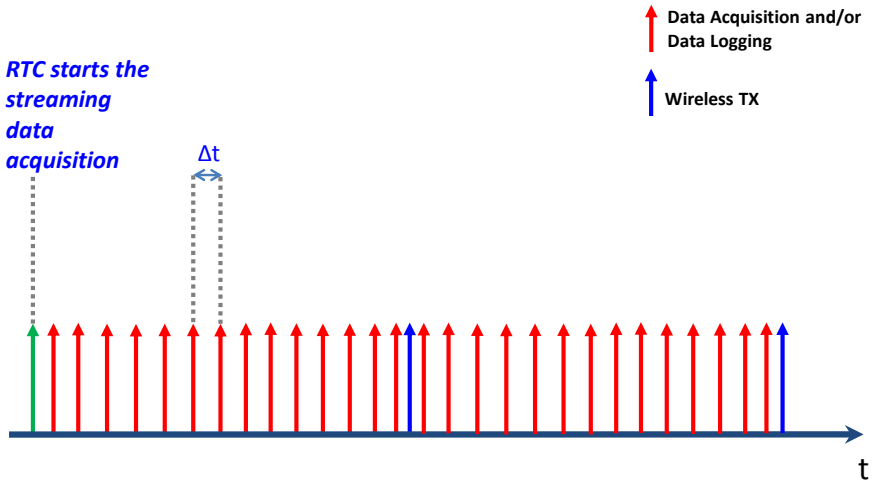
All the BeanDevice® integrates a RTC (Real-Time-clock) and a high accuracy timer for data sampling.

The RTC is a computer clock in the form of an integrated circuit that keeps track of the current time. It is used by the BeanDevice®.

Architecture of Real-Time-Clock & Timer on the BeanDevice®



A RTC (Real-Time-Clock) is used for starting the data sampling on a date (Year, Month, Hours, Minute and seconds).
A Timer is used for Data Sampling (Δt), the Timer source is a 16 MHz Crystal with a frequency stability of ±15 ppm at 25°C. Data transmission does not affect data sampling process.



10.2.1 Time-synchronization over the wireless sensor networks

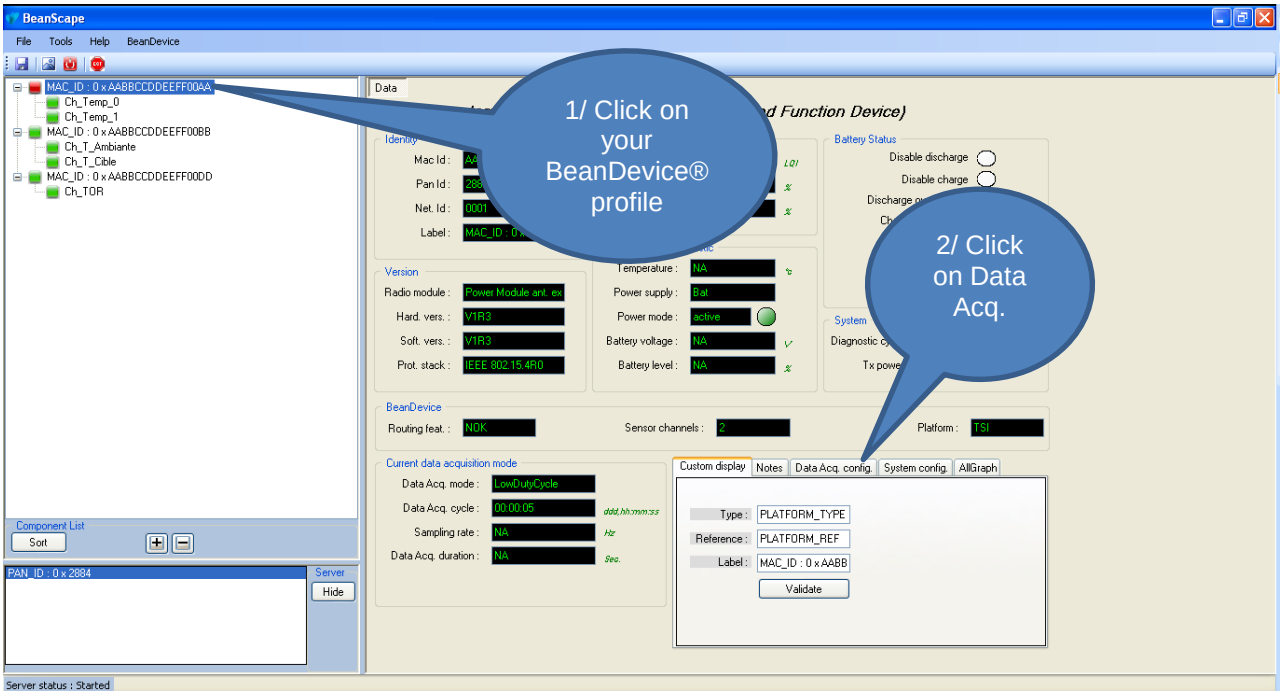
Accuracy @25°C	*5ms*

10.2.2 Crystal specifications

Nominal frequency	*16 Mz*
Frequency tolerance (at 25±3 °C)	*± 15 ppm*
Frequency Stability (vs. 25 °C)	*± 15 ppm*
Aging Rate	*± 3 ppm/year*

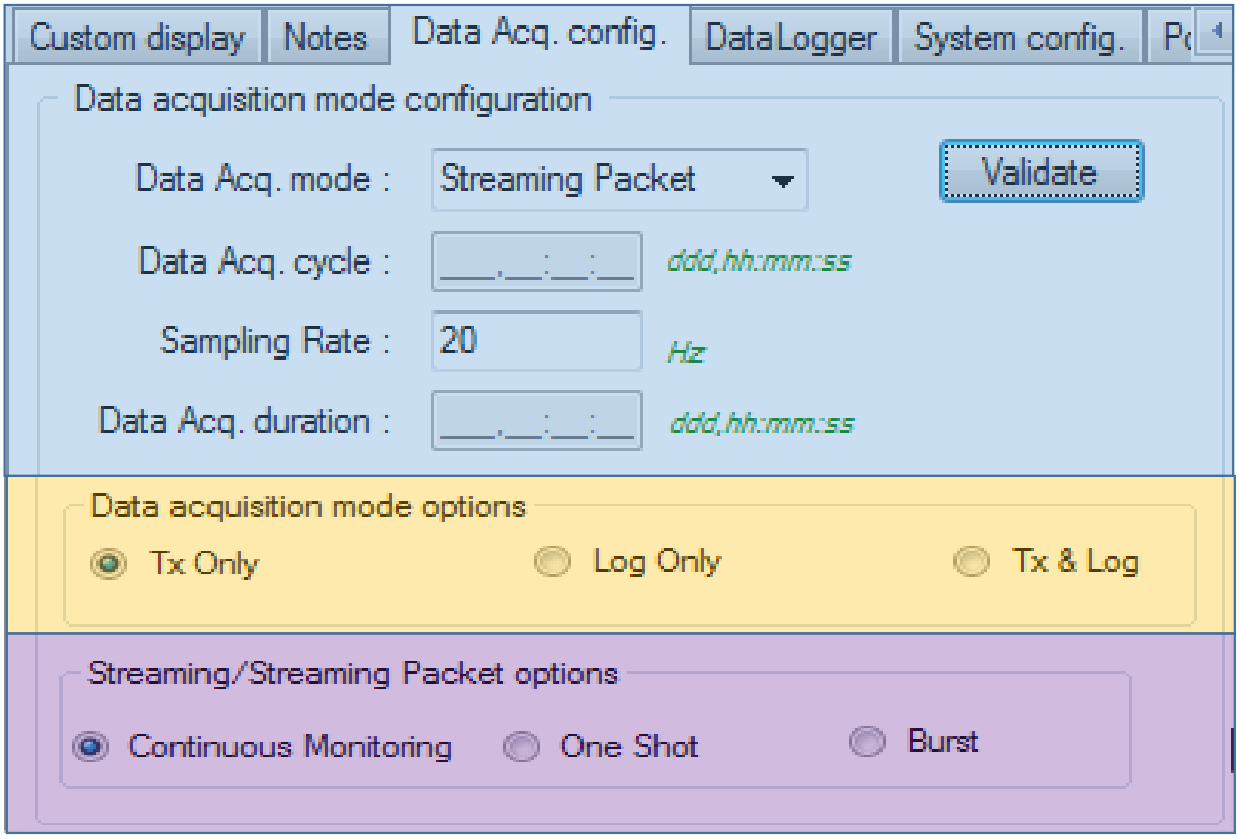
11. DATA ACQUISITION MODE CONFIGURATION FROM THE BEANSCAPE®

1. *Open your BeanScape®*
2. *Click on your BeanDevice® profile*
3. *Click on "Data Acq. config tag"*

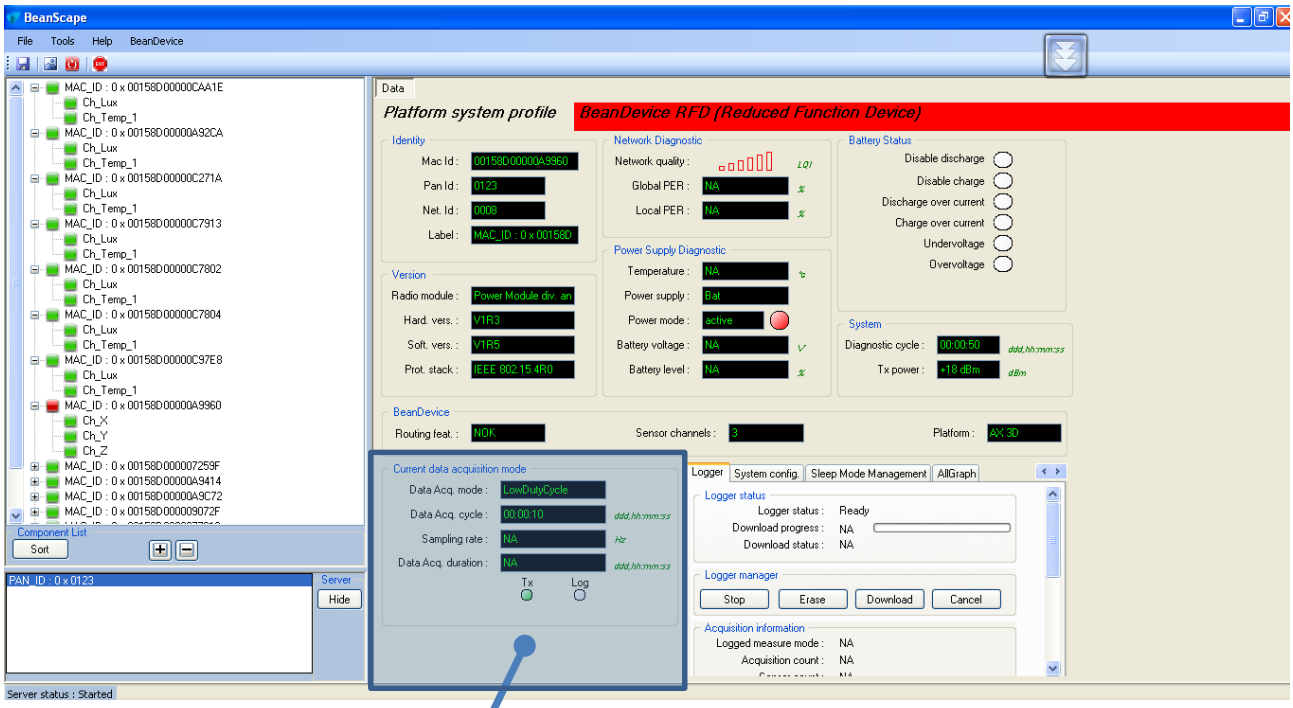


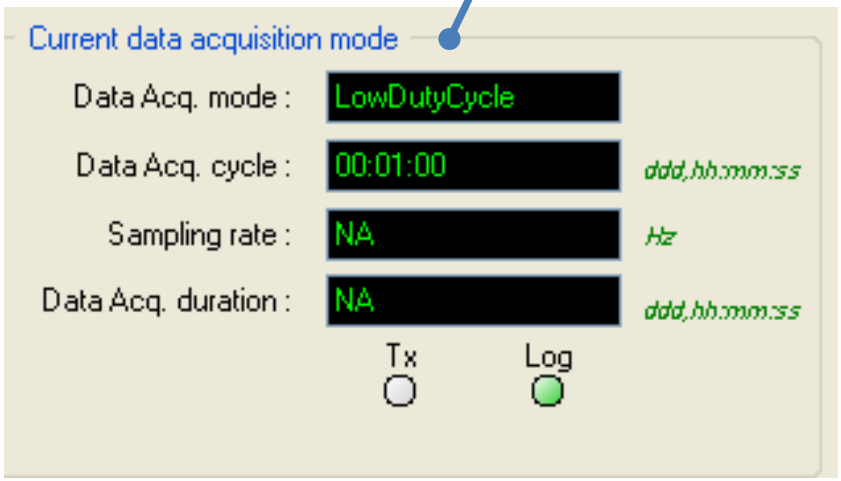
11.1 TAB: DATA ACQUISITION CONFIGURATION

11.1.1 Overview



All your modifications are displayed on "***Current data acquisition mode***" frame:



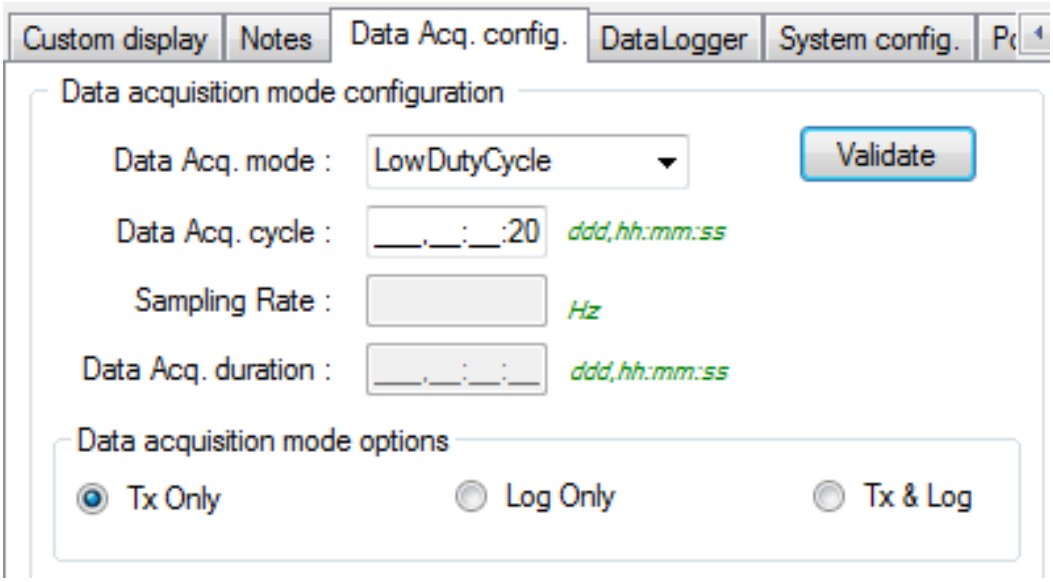


11.1.2 Data acquisition mode

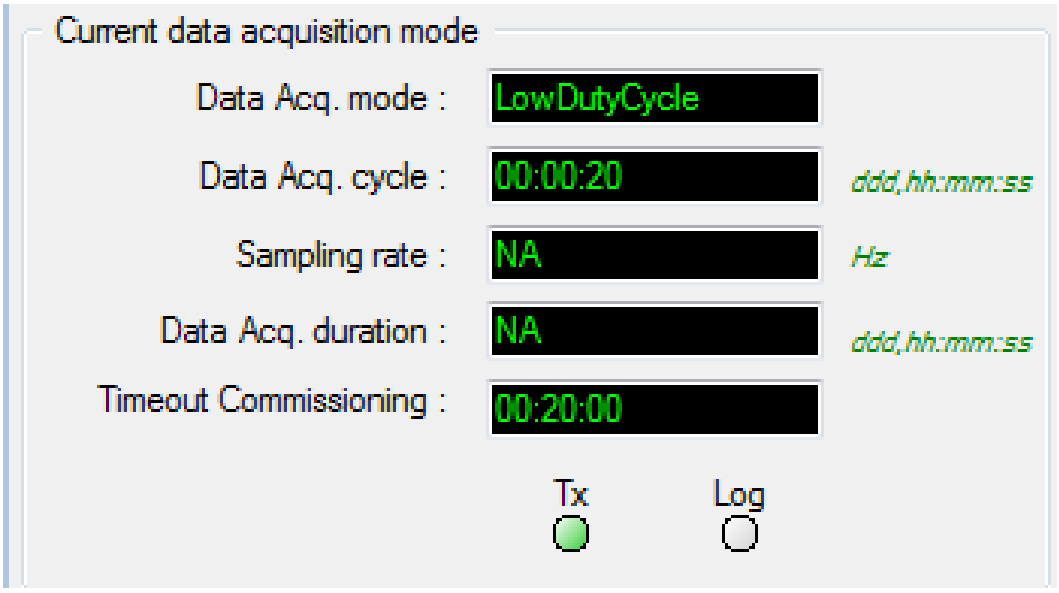
Data acquisition mode	Description
Low duty cycle Data Acquisition (LDCDA)	Low duty cycle data acquisition is dedicated for static measurement (tilt, pressure, temperature) requiring a low power power on your BeanDevice®. The duty cycle can be configured between 1 data acquisition & transmission per second to 1 data acquisition & transmission per day.
Alarm	Data acquisitions are transmitted by radio whenever an alarm threshold (user-configurable) is reached (4 alarms threshold levels High/Low).
Survey	Survey mode is a mix between the LDCDA mode and Alarm mode. A data acquisition is transmitted: • Whenever an alarm threshold (user-configurable) is reached (4 alarm threshold levels High/Low). ▪ A transmission cycle is reached, the transmission cycle is configurable through the BeanScape® 1s to 24h ;
Streaming Packet	Streaming packet is more suitable for users requiring a high data sampling rate (maximum 5 KHz). In order to achieve these performances, data sampling are transmitted by packet;
Streaming	Streaming mode is more suitable for users requiring a real-time data transmission (with time latency under 10ms).
SSD (Smart Shock Detection)	Smart shock detection mode is only available on the BeanDevice® AX-3DS. If a shock threshold is detected, the Beandevice® starts to transmit all the data acquisition to the BeanGateway®.
Commissioning	Commissioning mode allows the user to start a data acquisition on request. During commissioning mode, the BeanDevice® will wait for a new OTAC request transmitted by the BenGateway®: • No data acquisition is performed; • The Beandevice® is operating in active power mode;

11.1.3 Parameters related to "Low duty cycle data acquisition mode"

"Low Duty cycle" data acquisition configuration Tab



"Low Duty Cycle" status window



Parameters	Descriptions
Data acquisition Cycle	• Select the Data acquisition cycle between 1s and 24hours. • The format is: Day : Hour : Minute :Second
Data acquisition mode options	*Tx only*: The BeanDevice® transmits the data acquisition **without** datalogging *Log only*: The Beandevice® logs the data acquisition **without** wireless transmission *Tx & Log*: The BeanDevice® transmits **and** logs the data acquisition; For further information about the Data logger function, read the technical note TN_RF_007 – ***TN_RF_007 – "BeanDevice® DataLogger User Guide "***

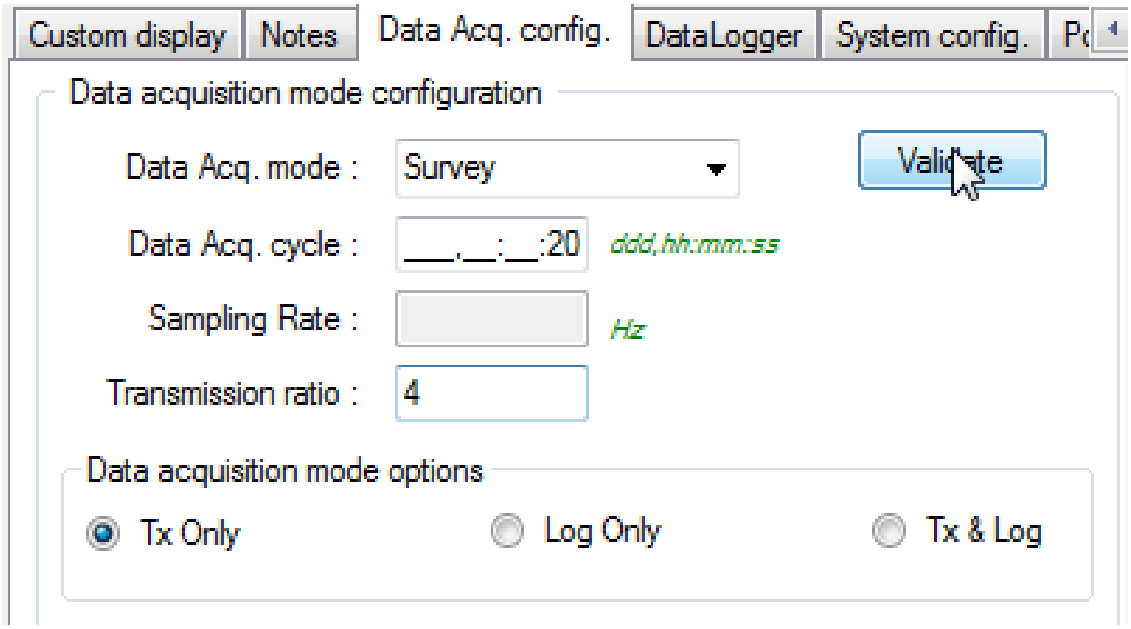
Data acquisition duration and Sampling rate parameters are not available for Low Duty Cycle Data acquisition.

11.1.4 Parameters related to "Alarm" data acquisition mode

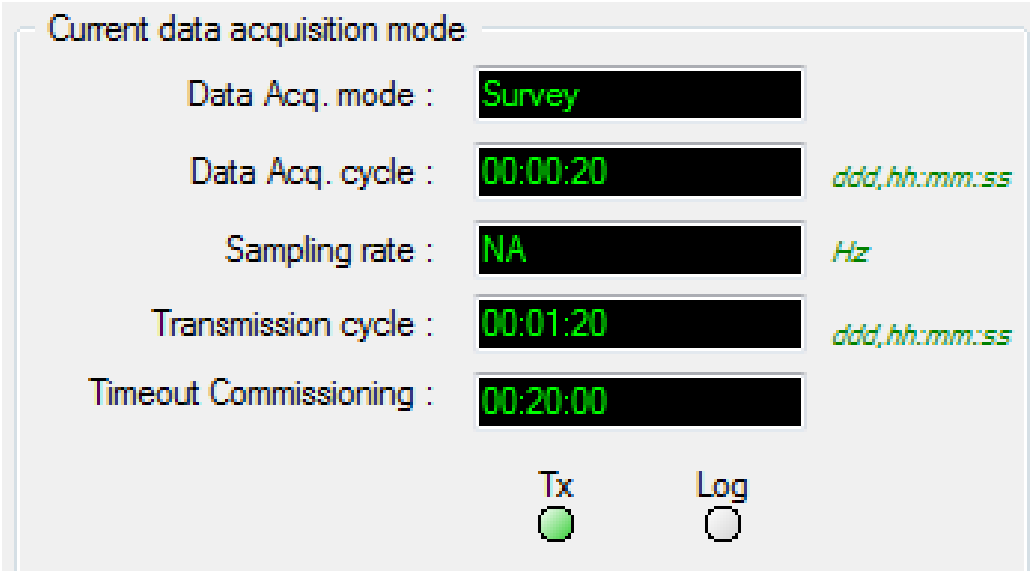
Parameters	Description
Data acquisition Cycle	Select the Data acquisition cycle between 1s and 24hours. The format is: Day : Hour : Minute :Second
Data acquisition mode options	*Tx only*: The BeanDevice® transmits the data acquisition **without** datalogging *Log only*: The Beandevice® logs the data acquisition **without** wireless transmission *Tx & Log*: The BeanDevice® transmits **and** logs the data acquisition; For further information about the Data logger function, read the technical note TN_RF_007 – ***TN_RF_007 – "BeanDevice® DataLogger User Guide "***

11.1.1 Parameters related to "Survey" data acquisition mode

"Survey" data acquisition configuration tab



"Survey" status window

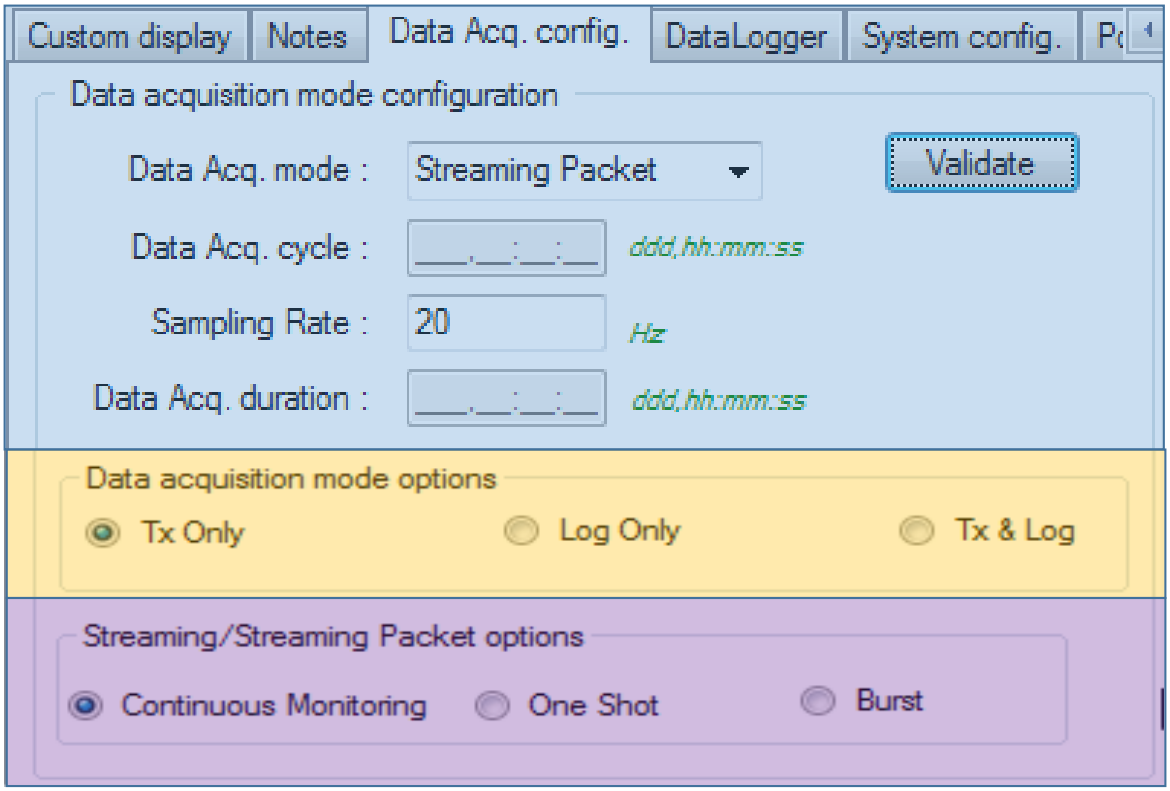


Parameters	*Description*
Data acquisition Cycle	Select the Data acquisition cycle between 1s and 24hours. The format is: Day : Hour : Minute :Second
Transmission Ratio	Select the transmission ratio Transmission cycle is calculated as follow: Transmission Cycle = "Transmission Ratio" * "Data Acquisition Cycle"
Data acquisition mode options	*Tx only*: The BeanDevice® transmits the data acquisition **without** datalogging *Log only*: The Beandevice® logs the data acquisition **without** wireless transmission *Tx & Log*: The BeanDevice® transmits **and** logs the data acquisition; For further information about the Data logger function, read the technical note TN_RF_007 – ***TN_RF_007 – "BeanDevice® DataLogger User Guide "***

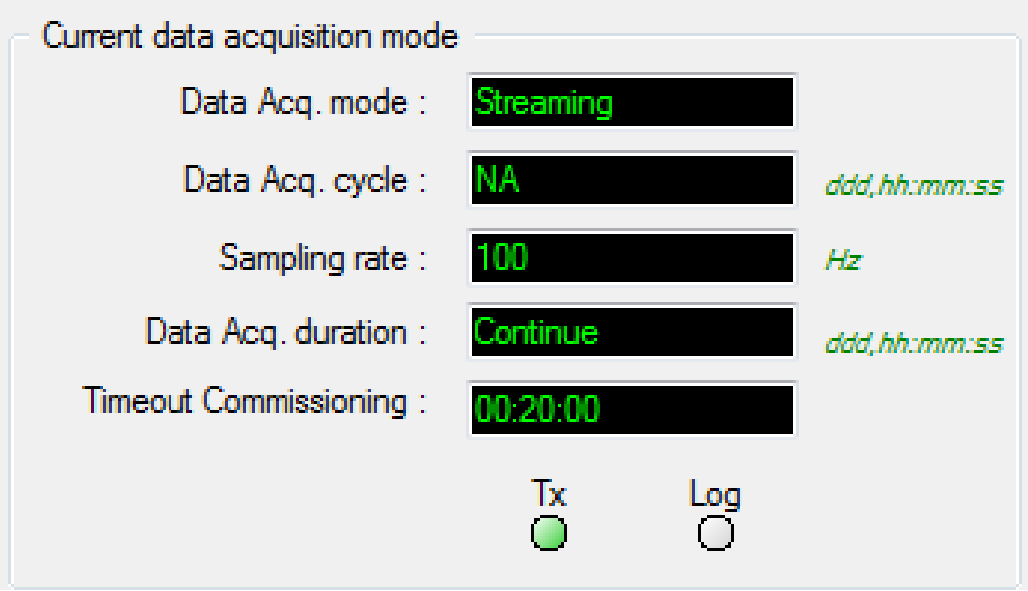
Sampling rate parameter is not available for the Survey data acquisition mode

11.1.2 Parameters related to "Streaming/Streaming packet "

"Streaming/Streaming Packet" data acquisition configuration tab



"Streaming/Streaming Packet" status window



Parameters	Description
Data acquisition Cycle	Select the Data acquisition cycle between 1s and 24hours. The format is: Day : Hour : Minute :Second This parameter is enabled if the "***Burst***" option is selected
Sampling rate	Select the sampling rate of your BeanDevice® between 1 sample per second and 3000 samples/s maximum (depending on the BeanDevice® product used). The resolution is 1 sample per second. Choose carefully the sampling rate value: ✓ The PER (Packet Error Rate) may increase if a high sampling rate value is settled on your BeanDevice®. For further information read the technical note ***RF_TN_003- "Aggregation capacity of wireless sensor networks"*** ✓ Power consumption increases with the sampling rate

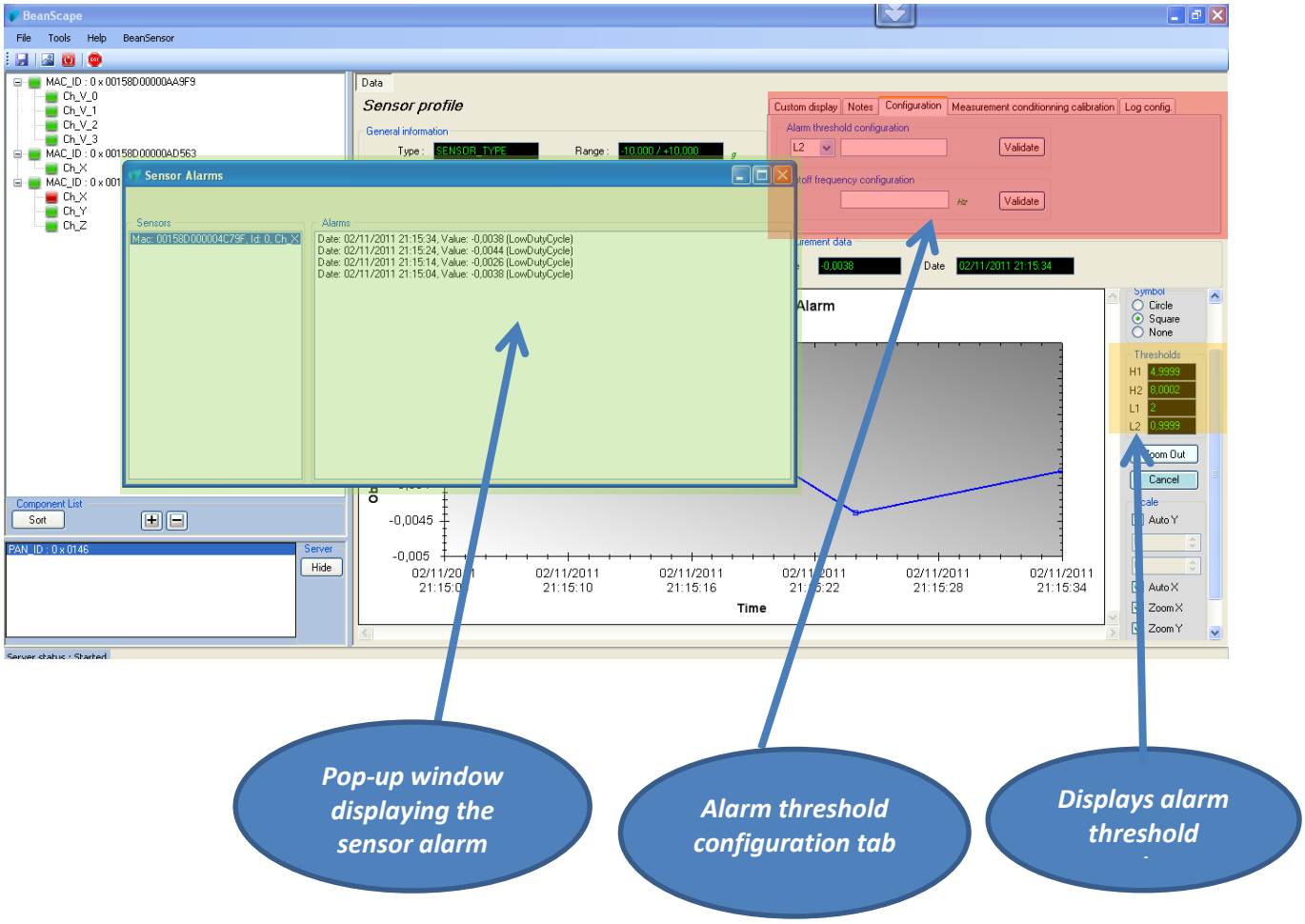
Data acquisition duration	Defines the duration of the streaming/streaming packet data acquisition. The format is Day : Hour : Minute :Second "Data acquisition duration" value should be lower than "Data acquisition cycle". This parameter is enabled if the "***Burst***" or "***One Shot***" options are selected.
Data acquisition mode options	***Tx only***: The BeanDevice® transmits the data acquisition **without** datalogging ***Log only***: The Beandevice® logs the data acquisition **without** wireless transmission ***Tx & Log***: The BeanDevice® transmits **and** logs the data acquisition; For further information about the Data logger function, read the technical note TN_RF_007 – ***TN_RF_007 – "BeanDevice® DataLogger User Guide "***
Streaming/Streaming Packet Options	***« Continuous monitoring » option***: data acquisition is transmitted to the ***Beangateway®*** in a continuous flow rate. ***« Burst » option***: data acquisition is transmitted to the ***Beangateway®*** in a burst flow rate ***« One Shot » option***: data acquisition is transmitted to the ***BeanGateway®*** during a period time, then the ***BeanDevice®*** enters into commissioning mode.

11.1.3 Parameters related to "Commissioning"

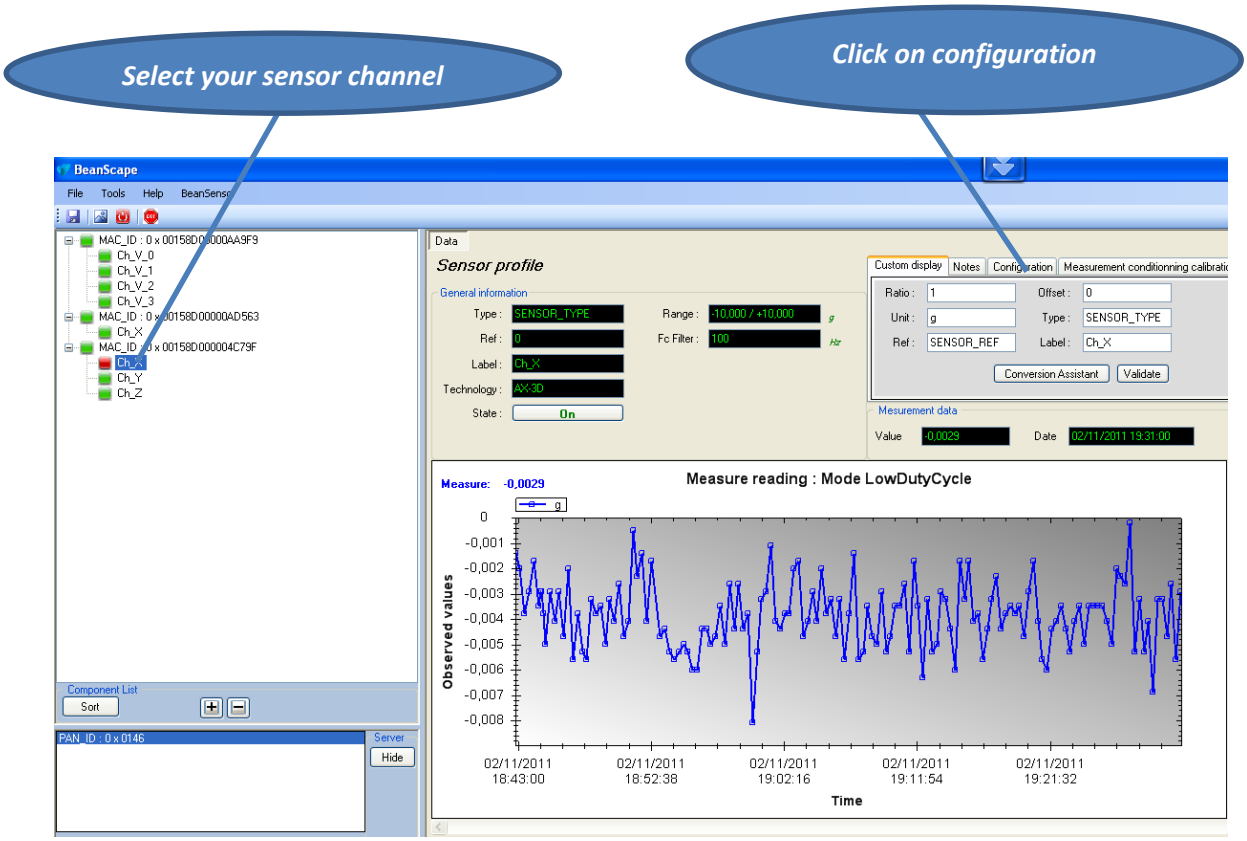
Parameters	*Descriptions*
Timeout	Timeout linked to the commissioning. ***The format is***: Day : Hour : Minute :Second If a timeout value is reached, the BeanDevice® switch into the "Standby Commissioning" mode. During this phase, wireless communication is stopped on the BeanDevice®. The user should power off and then power on its BeanDevice®.

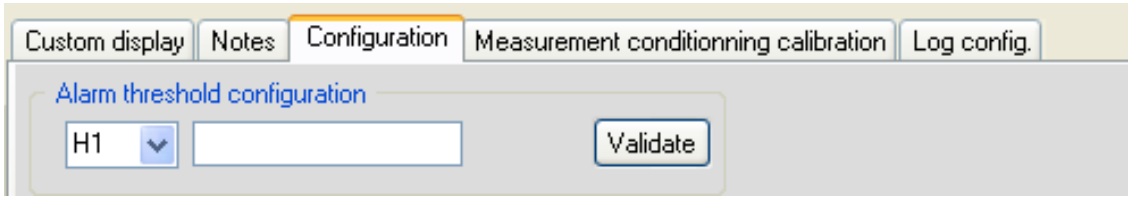
11.2 ALARM THRESHOLD CONFIGURATION FROM THE BEANSCAPE®

11.2.1 Overview



11.2.2 How to set an alarm threshold



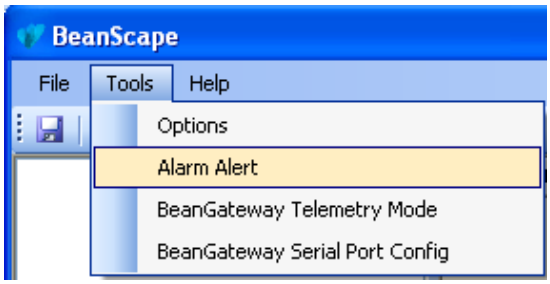


Parameter	*Description*
Alarm threshold	You can configure threshold high values (H1, H2) and low values (L1,L2) . In alarm mode, when a higher low threshold value is reached, an alarm notification is transmitted to the BeanGateway ; ✓ If the sensor value is higher than H1/H2, an alarm notification is send to the BeanGateway/BeanScape; ✓ If the sensor value is lower than L1/L2, an alarm notification is send to the BeanGateway/BeanScape;. Threshold values must be organized in this manner: H2>= H1 > L1>=L2

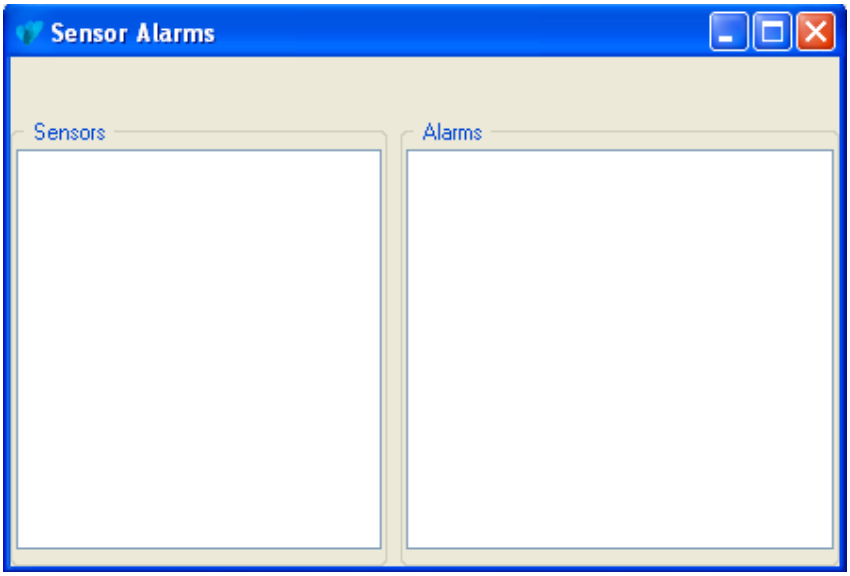
11.2.3 Sensor alarms window

The BeanScape® provides user a detailed and neatly viewed alarm list (four user configurable alarms Up/Down). A real time diagnostic alarm is generated by the BeanAir® expert system.

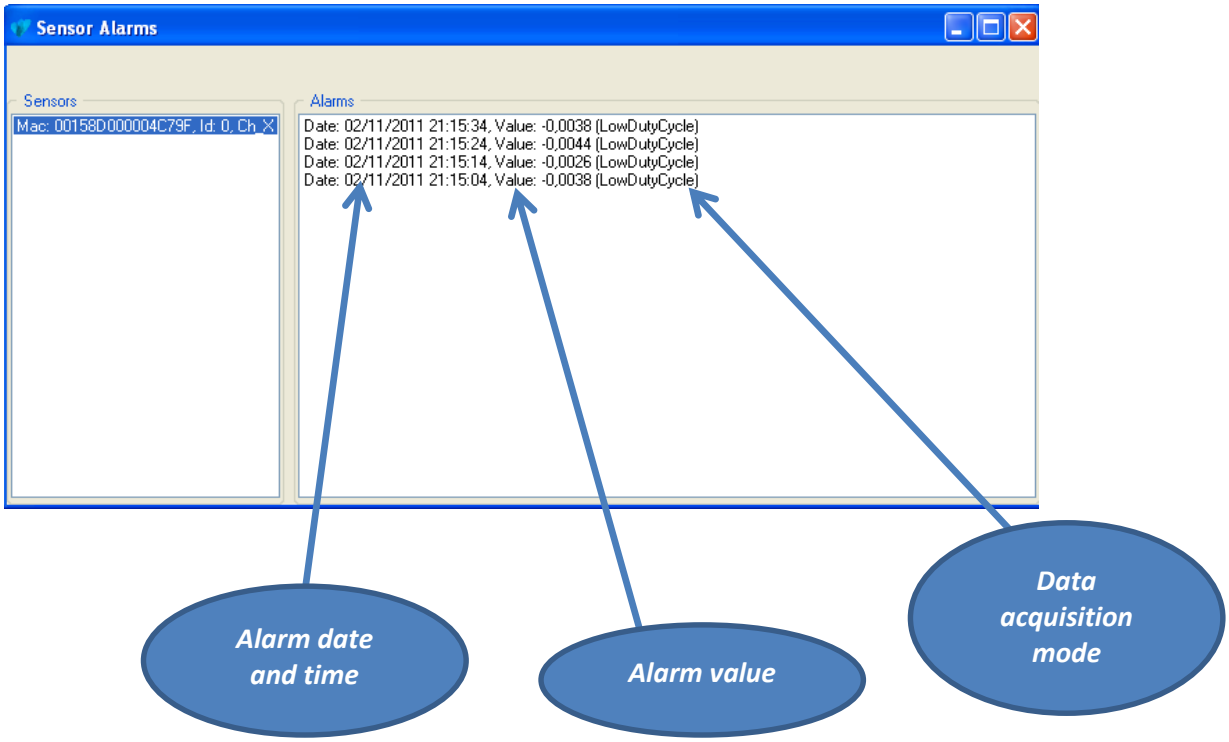
- Select the desired platform by clicking on "Tools" scrolling menu available on the left side pane.
- Then Click :



- You will see the following screen :



- Please note that this window automatically opens when the alarm threshold is exceeded.



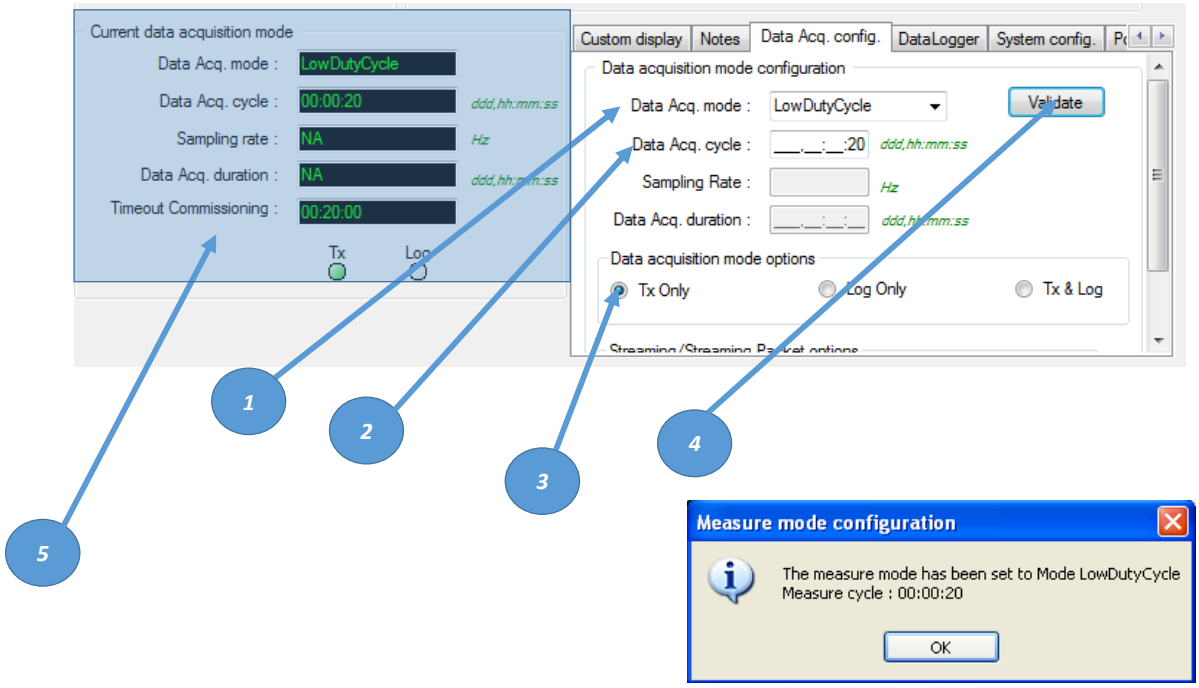
12. EXAMPLES

12.1 LOW DUTY CYCLE ACQUISITION MODE

12.1.1 Configuration

Ex: The Beandevice® should be configured in Low Duty Cycle acquisition mode with a Data acquisition cycle of 20s.

Proceed as follows:



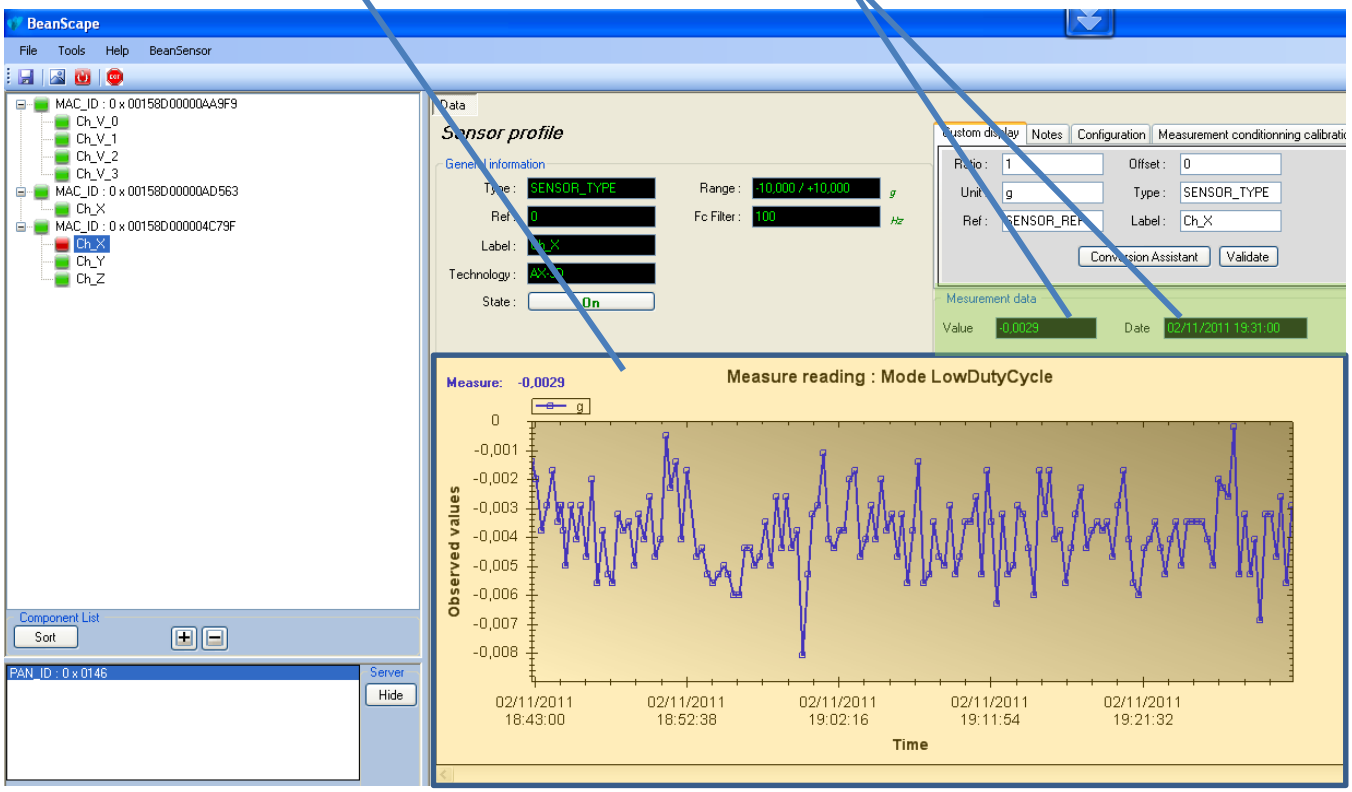
1	*Choose "LowDutyCycle " in Data acquisition mode*
2	*Enter a data acquisition cycle of 20s*
3	*Choose the Datalogger option. In this example, we configure the BeanDevice® in TX only*
4	*Click on validate to validate your new configuration*
5	*A Pop-up window displays the new configuration*
6	*If the new data acquisition mode configuration is accepted by the BeanDevice®, all the parameters are displayed in the frame "Current data acquisition mode"*

12.1.2 Graph visualization

The graph displays all the data acquisition in Low Duty cycle:

Graph corresponding to Low Duty Cycle acquisition mode

Latest data acquisition value and date



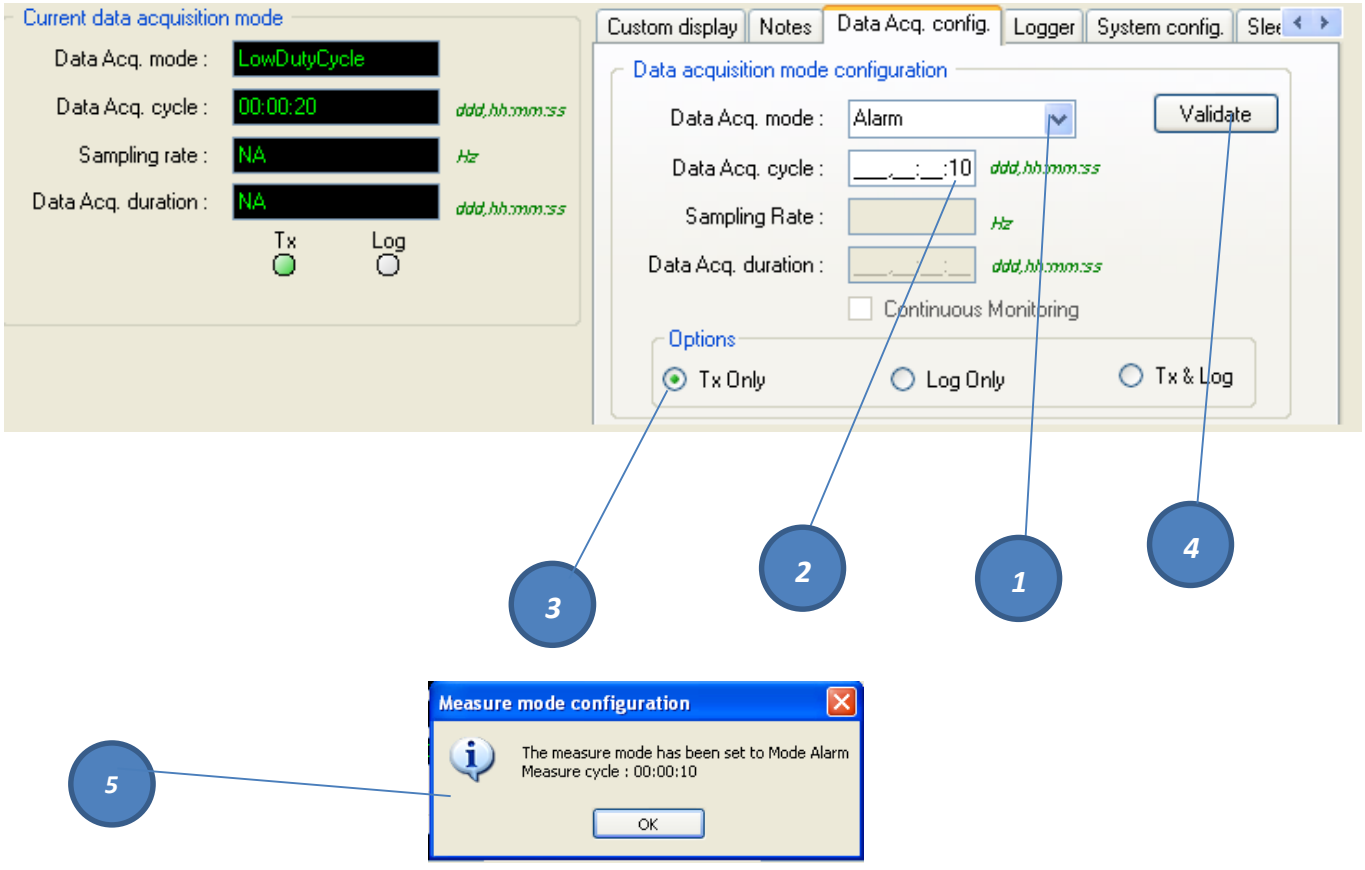
12.2 ALARM MODE

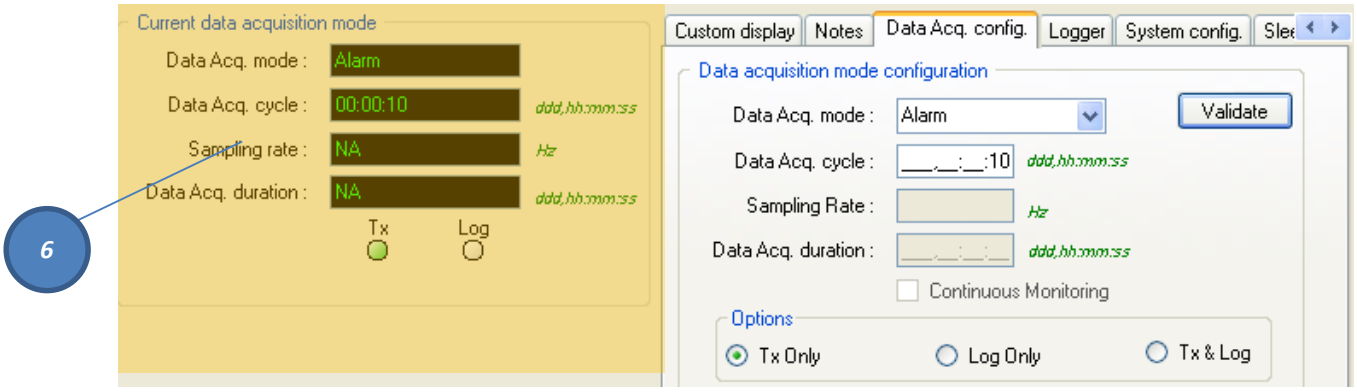
If the alarms thresholds H1/H2/L1/L2 are not well defined, you can end up with spurious and untimely alarms. Do not forget to properly configure the alarms thresholds before starting the alarm mode. Read the section "Alarm threshold configuration from the BeanScape®"

12.2.1 Alarm mode configuration

Ex: The Beandevice® must be configured in Alarm data acquisition mode with a Data acquisition cycle of 10s.

Proceed as follows:



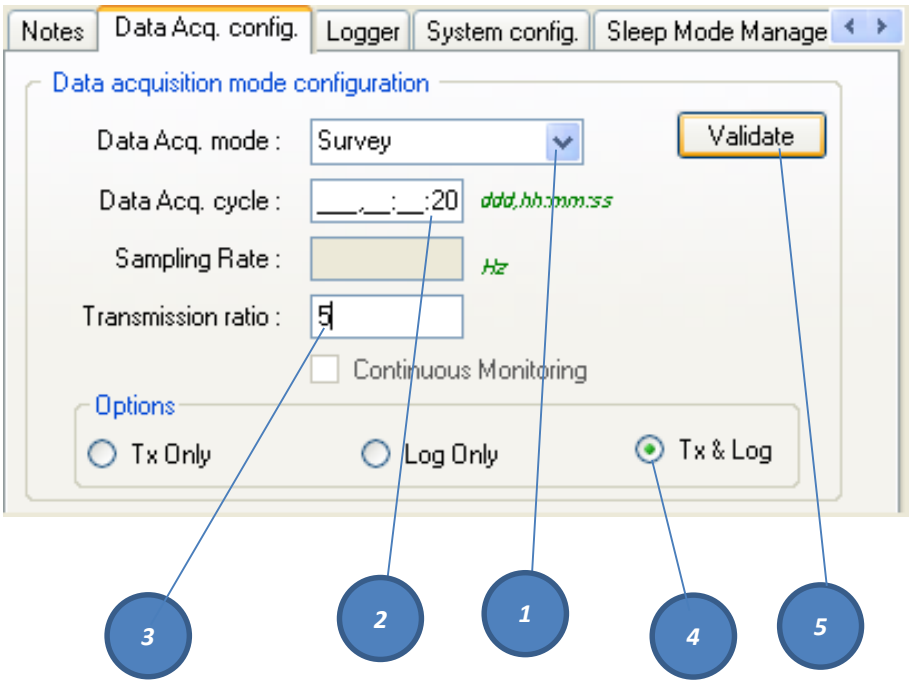


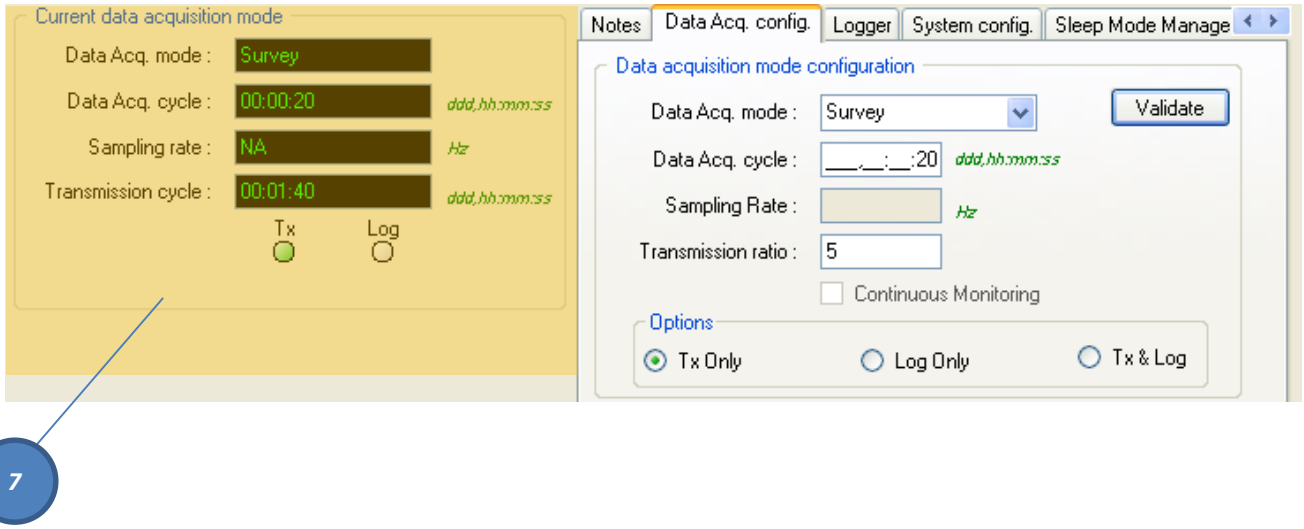
1	*Choose "Alarm "*
2	*Enter a data acquisition cycle of 10s*
3	*Choose the Datalogger option: here TX only (no Datalogging)*
4	*Click on validate to enable your new configuration*
5	*A Pop-up window displays the new configuration*
6	*If the new data acquisition mode configuration is accepted by the BeanDevice®, all the parameters are displayed in the frame "Current data acquisition mode"*

12.3 SURVEY MODE

If the alarms thresholds H1/H2/L1/L2 are not well defined, you can end up with spurious and untimely alarms. Do not forget to properly configure the alarms thresholds before starting the alarm mode. Read the section "Alarm threshold configuration from the BeanScape®".

12.3.1 Survey mode configuration

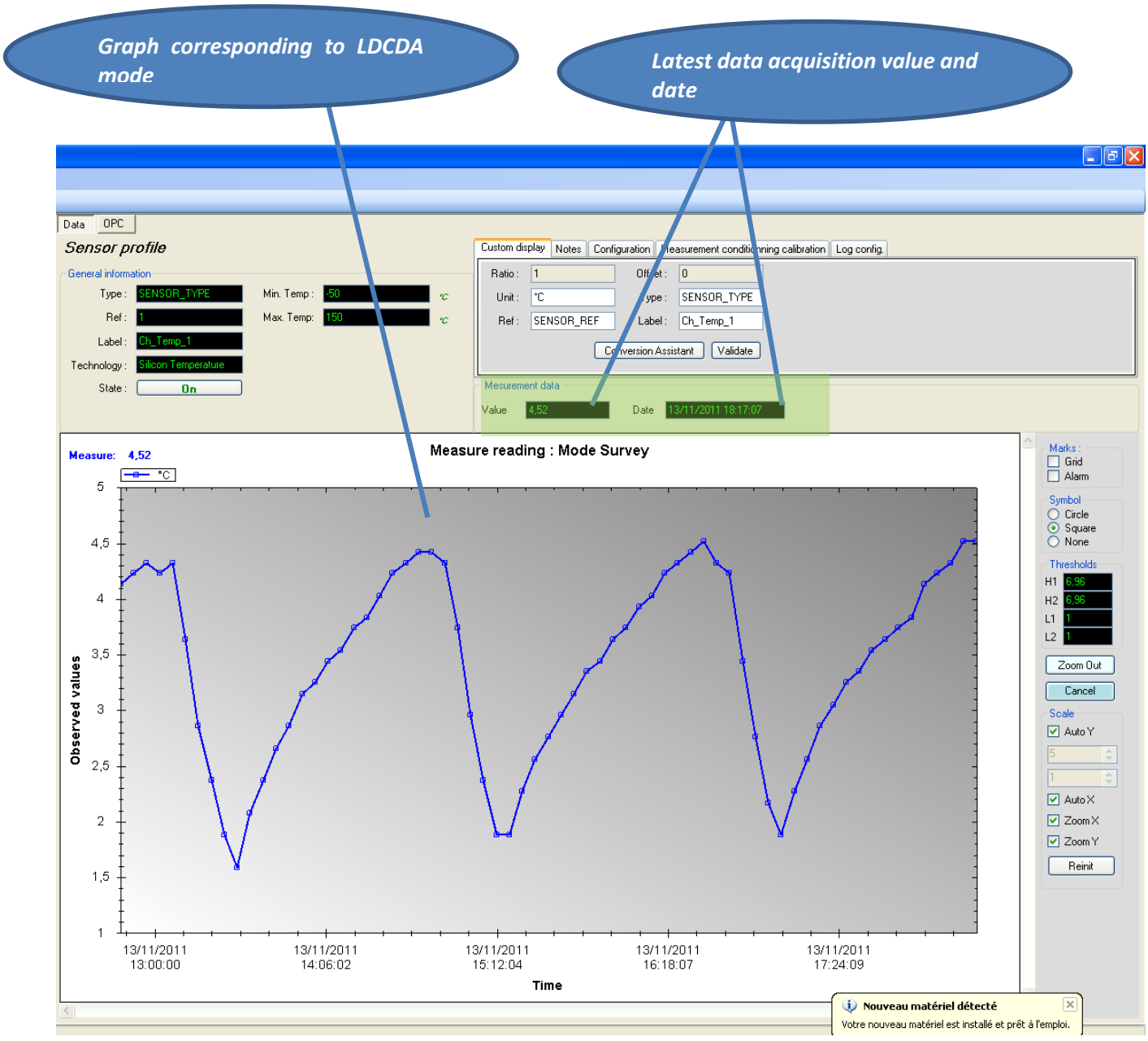




1	*Choose "Survey "*
2	*Enter a Data acquisition cycle of 20s*
3	*Enter a transmission ratio of 5*
4	*Choose the Datalogger option: here TX and Log*
5	*Click on validate to enable your new configuration*
6	*A Pop-up window displays the new configuration*
7	*If the new data acquisition mode configuration is accepted by the BeanDevice®, all the parameters are displayed in the frame "Current data acquisition mode"*

12.3.2 Graph visualization

Example of Survey mode on the BeanDevice® ONE-T (wireless temperature sensor) :



12.4 STREAMING MODE (WITH CONTINUOUS MONITORING)

12.4.1 Streaming mode configuration (with "continuous monitoring" option)

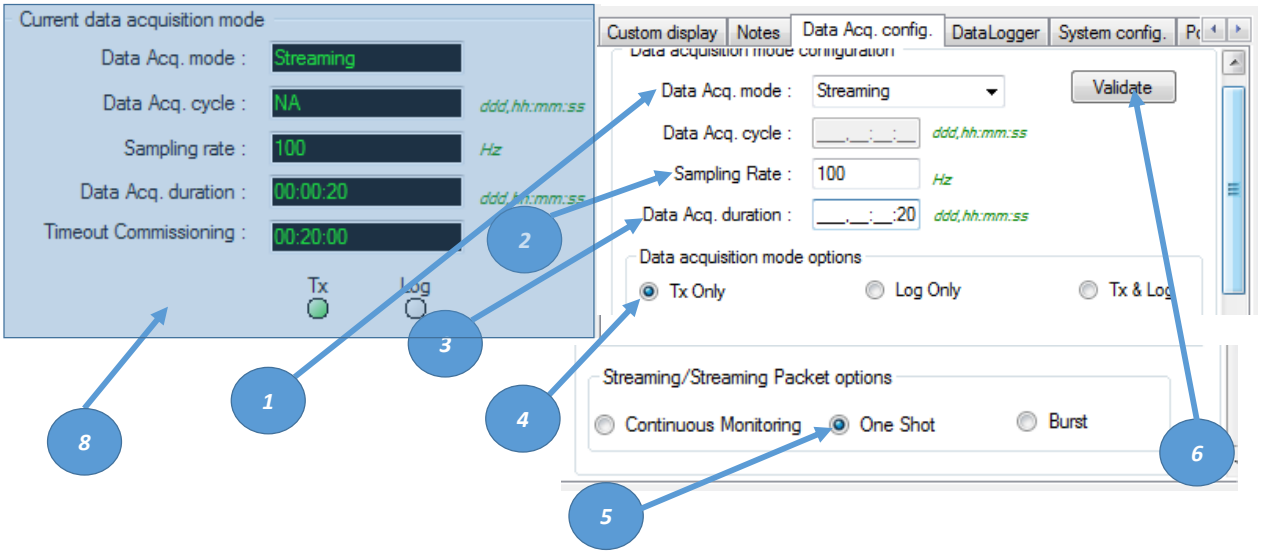
Ex: The Beandevice® is configured in streaming mode with a sampling rate of 100 Hz. "Continuous monitoring" and "Tx" options are enabled.

Proceed as follows:

1	*Choose "Streaming Packet"*
2	*Enter a sampling rate of 100 Hz*
3	*Select Tx option*
4	*Check "Continuous monitoring"*
5	*Click on validate to enable your new configuration*
6	*A Pop-up window displays the new configuration*
7	*If the new data acquisition mode configuration is accepted by the BeanDevice®, all the parameters are displayed in the frame "Current data acquisition mode".*

12.4.1 Streaming Mode configuration (with "one shot" option)

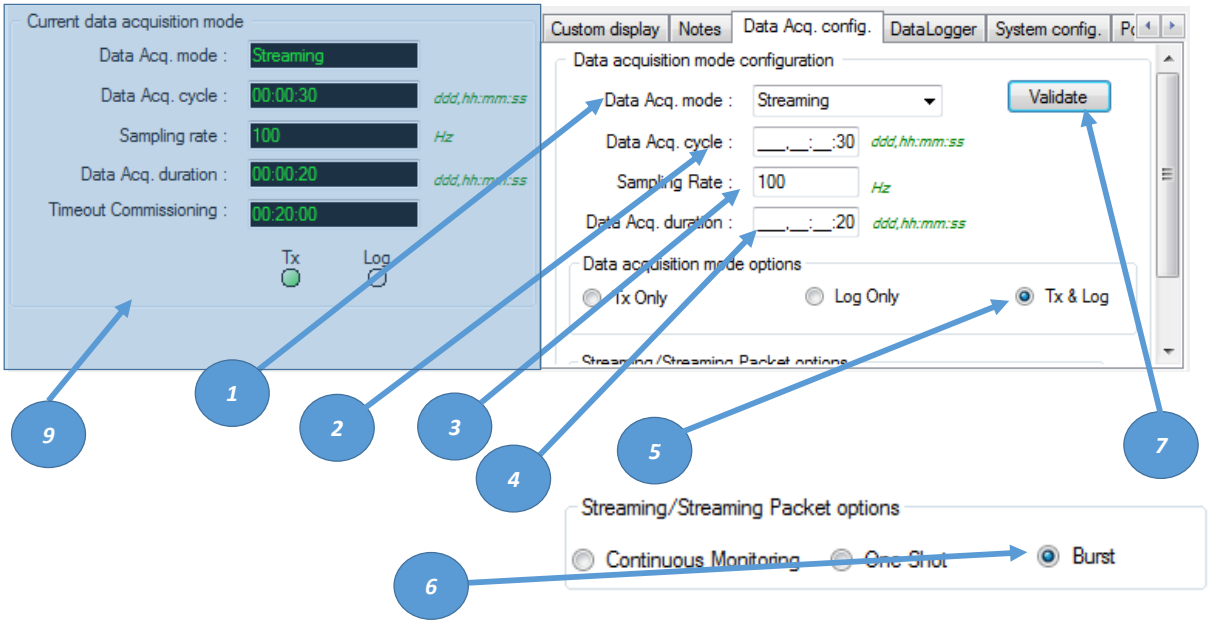
Ex: The Beandevice® is configured in streaming data acquisition mode with a sampling rate of 100 Hz. "One shot" and "Tx" options are enabled.



1	*Choose "Streaming"*
2	*Enter a sampling rate of 100 Hz*
3	*Enter a data acquisition duration of 20s*
4	*Check "Tx" option*
5	*Check "One shot"*
6	*Click on validate to enable your new configuration*
7	*A Pop-up window displays the new configuration*
8	*If the new data acquisition mode configuration is accepted by the BeanDevice®, all the parameters are displayed in the frame "Current data acquisition mode"*

12.4.2 Streaming Mode configuration (with "burst" option)

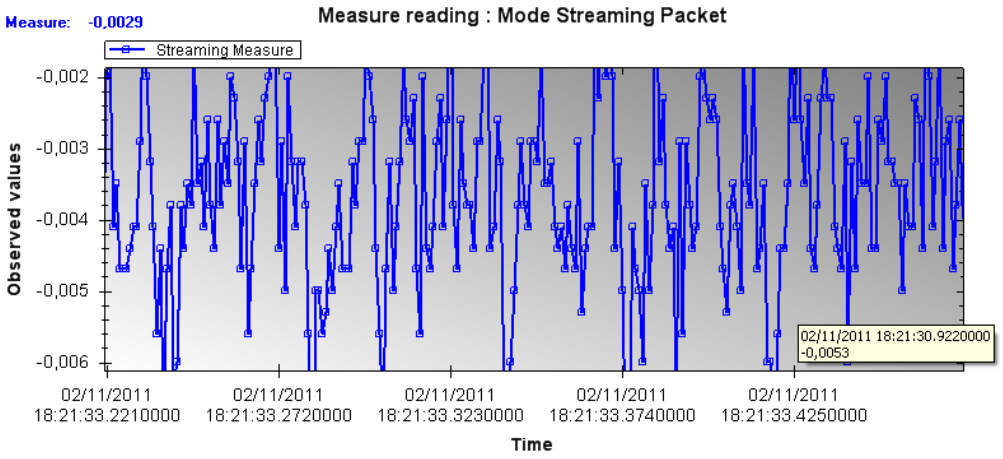
Ex: The Beandevice® is configured in streaming data acquisition mode with a sampling rate of 100Hz."Burst" and "Tx" options are enabled.



1	*Choose "Streaming"*
2	*Enter a duty cycle of 30s*
3	*Enter a sampling rate of 100 Hz*
4	*Enter a data acquisition duration of 20s*
5	*Check "Tx and Log" option*
6	*Check "Burst"*
7	*Click on validate to enable your new configuration*
8	*A Pop-up window displays the new configuration*
9	*If the new data acquisition mode configuration is accepted by the BeanDevice®, all the parameters are displayed in the frame "Current data acquisition mode"*

12.4.3 Graph visualization

Example of Streaming packet mode on the BeanDevice® AX-3D (wireless accelerometer) :

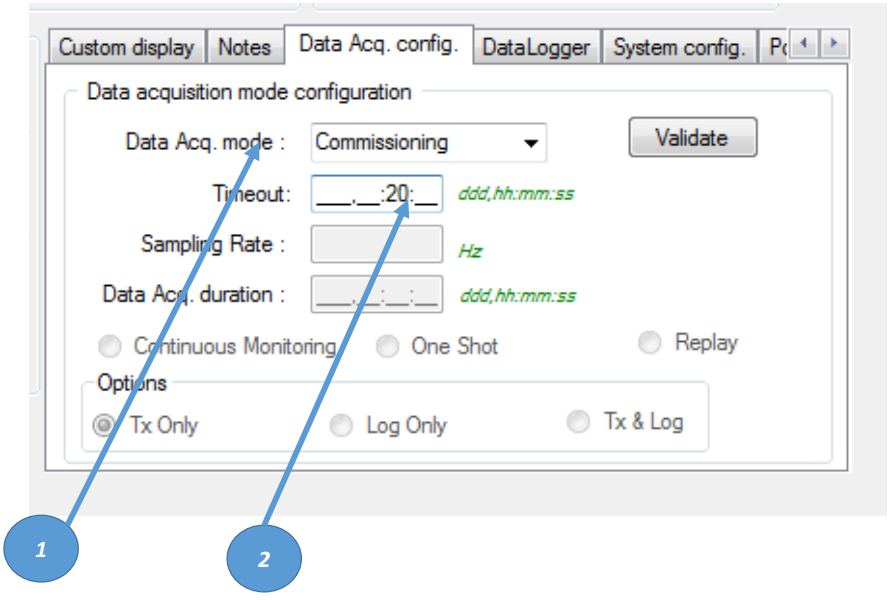

Measure: -0,0029
Measure reading : Mode Streaming Packet
Streaming Measure
Observed values
-0,002
-0,003
-0,004
-0,005
-0,006
02/11/2011 18:21:30.9220000
-0,0053
02/11/2011 18:21:33.2210000
02/11/2011 18:21:33.2720000
02/11/2011 18:21:33.3230000
02/11/2011 18:21:33.3740000
02/11/2011 18:21:33.4250000
Time

12.5 COMMISSIONING MODE

Ex: The Beandevice® should be configured in Commissioning mode with a Timeout value of 20 minutes.

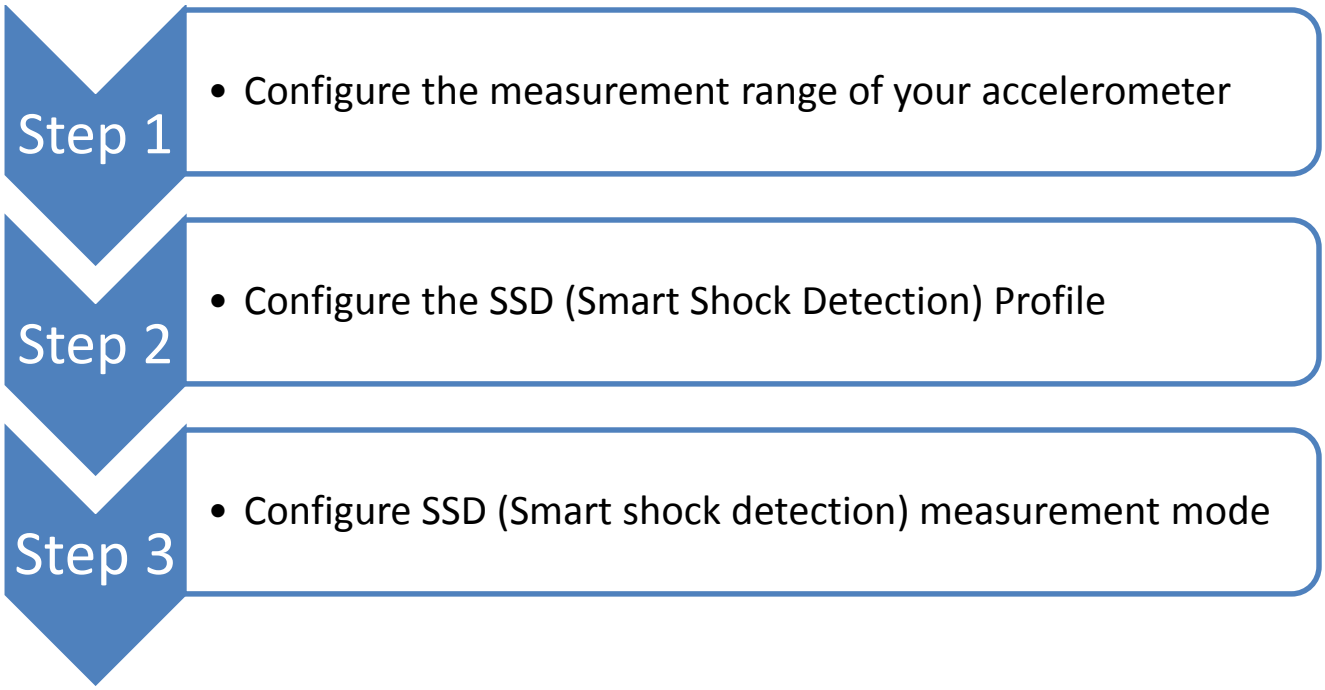
Proceed as follows :

1	***Choose "Commissioning mode"***
2	***Enter the timeout value of 20 minutes. If the Timeout occurs, the BeanDevice® will switch into the "standby commissioning" power mode.***

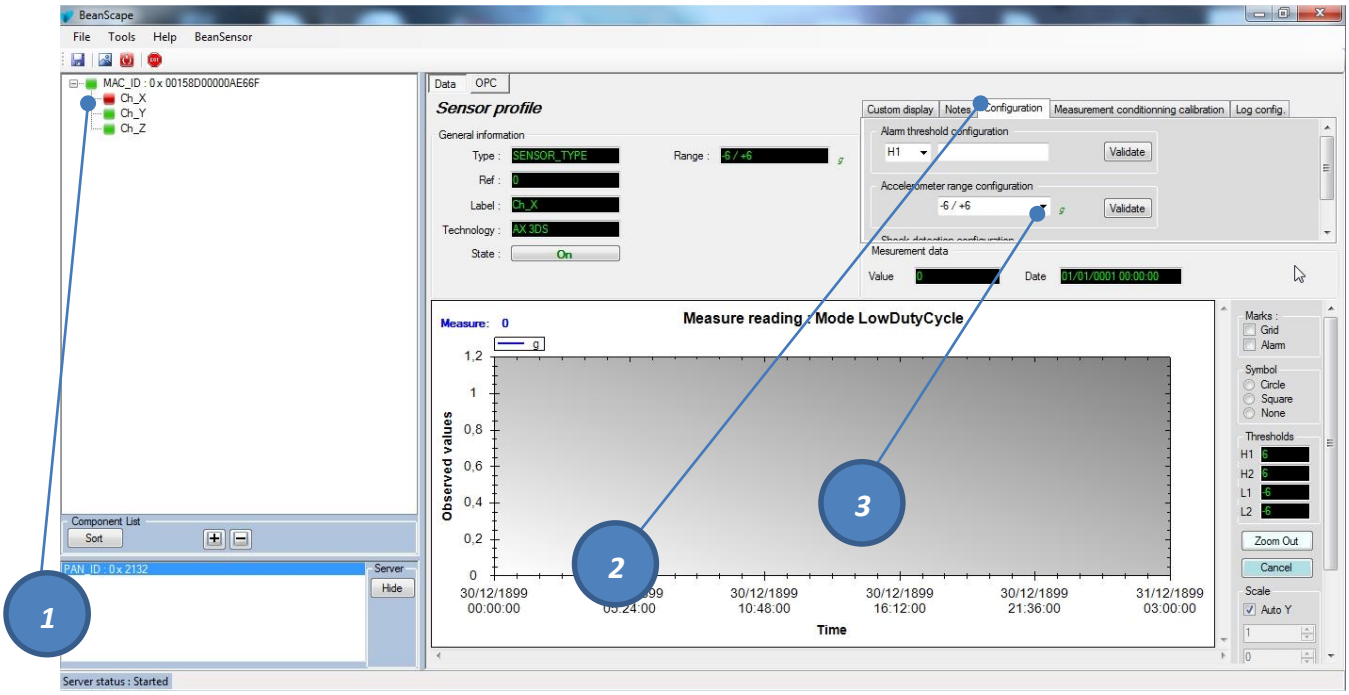


12.6 SSD (SMART SHOCK DETECTION)

SSD function is only available on the ***BeanDevice® AX-3DS*** :


Step 1
• Configure the measurement range of your accelerometer
Step 2
• Configure the SSD (Smart Shock Detection) Profile
Step 3
• Configure SSD (Smart shock detection) measurement mode

12.6.1 Step 1: configure the measurement range of your accelerometer



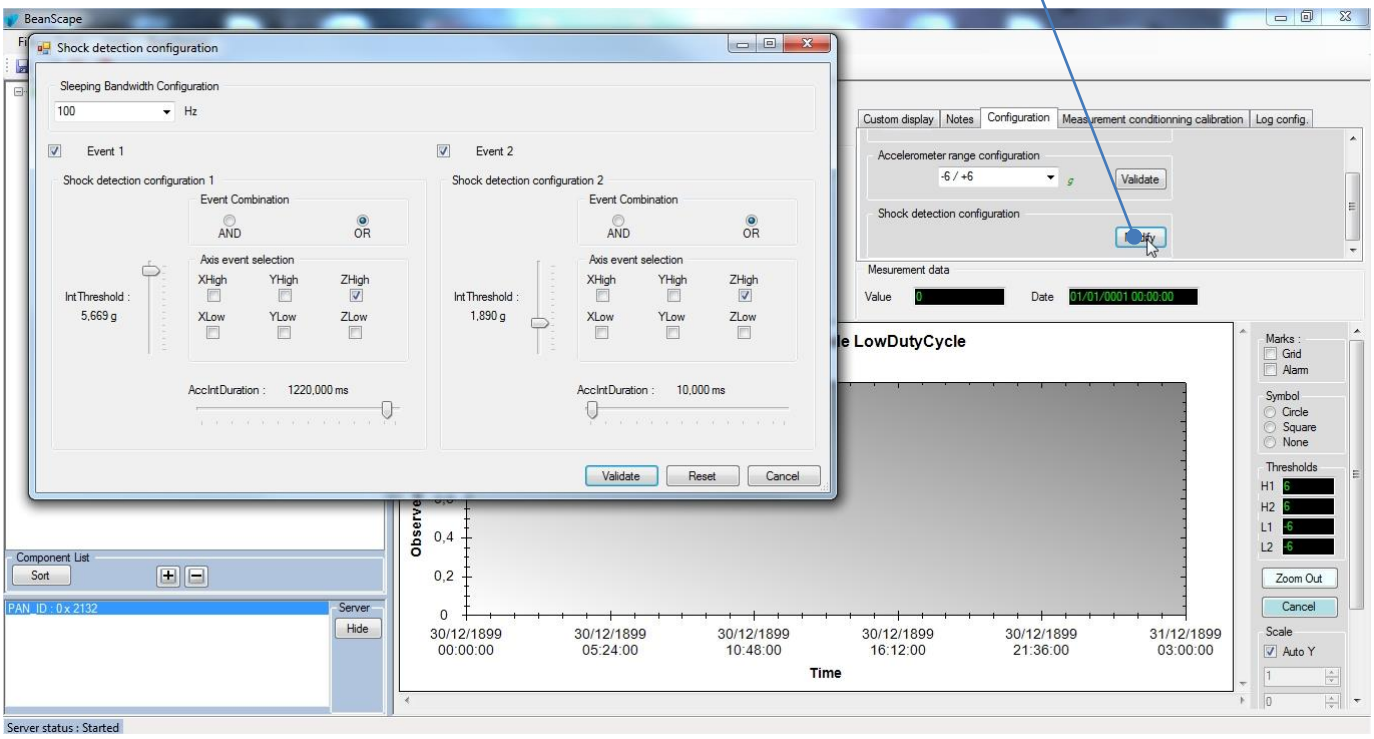
1 **Click on your sensor channel**

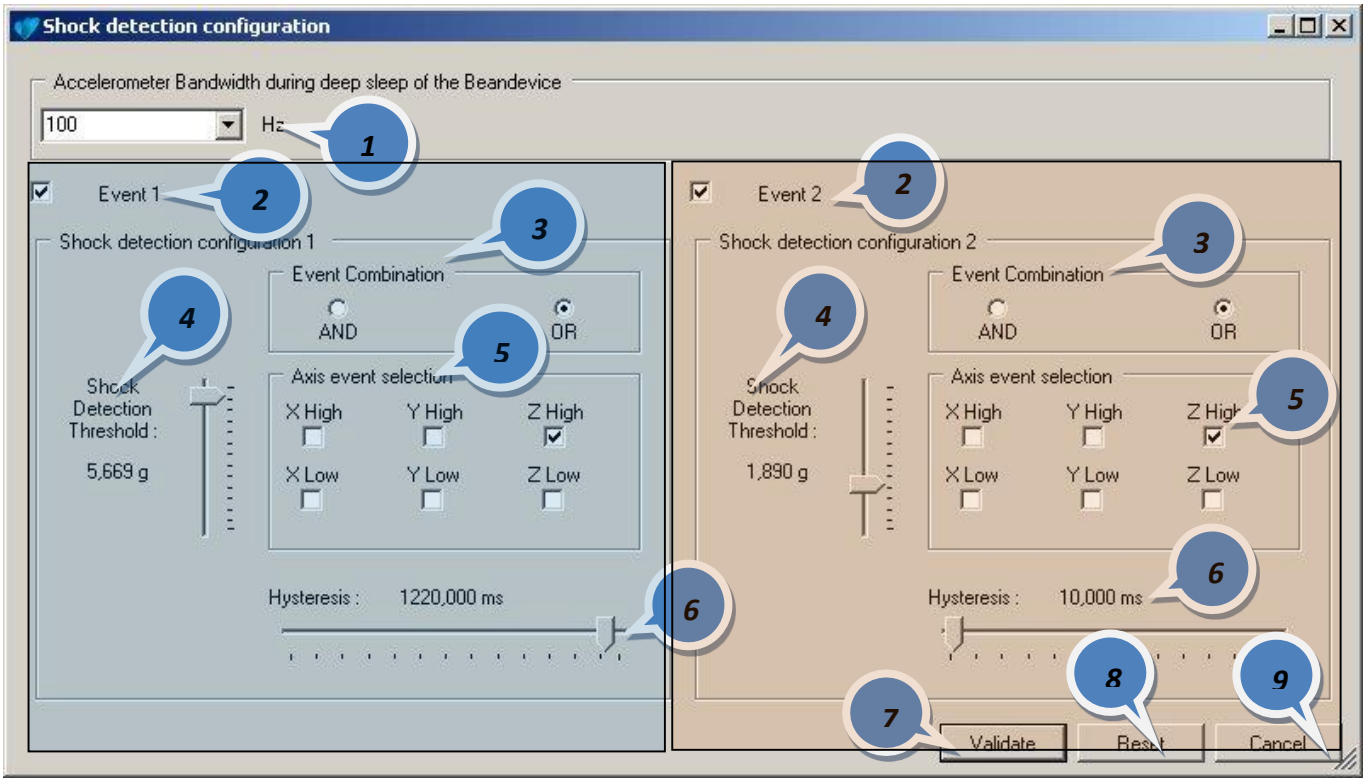
2 **Click on the sensor configuration tab**

3 **Choose your accelerometer range and click on validate**

12.6.2 Step 2: Configure the SSD profile

Click on Shock detection configuration, a new window will open:



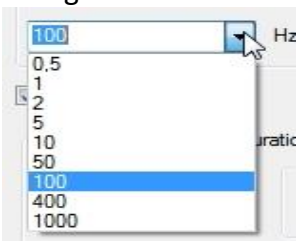


Shock detection configuration 1

Shock detection configuration 2

1

Changes the accelerometer bandwidth during the sleep period of the Beandevice®:



Depending on the sampling rate of the accelerometer during the sleep period, the BeanDevice® current consumption can vary:

Accelerometer sampling rate during sleep period	*BeanDevice® Current consumption*
0,5 Hz	*21 µA*
1 Hz	*31 µA*
2 Hz	*50 µA*
5 Hz	*78 µA*
10 Hz	*130 µA*
50 Hz	*302 µA*
100 Hz	*308 µA*
400 Hz	*343µA*
1000 Hz	*413 µA*

2

The user can select two events profile ***Event 1*** and ***Event 2.***

3

Event combination

The user can use two logical combinations: ***AND*** and ***OR*** combination on the axis event selection.

4

Set the shock detection threshold

Unit value: g

The threshold resolution depends highly on the acceleration range.

On the axis event selection frame, if the high axis is selected, the threshold value will be positive.

If the Low axis is selected, the threshold value will be negative.

Example: For a threshold value settled at 2g, if X High Axis **OR** X Low Axis is selected.

For all the values upper than 2g on the X Axis, a shock event is detected

For all the values less than -2g on the X Axis, a shock event is detected.

5

Axis event selection

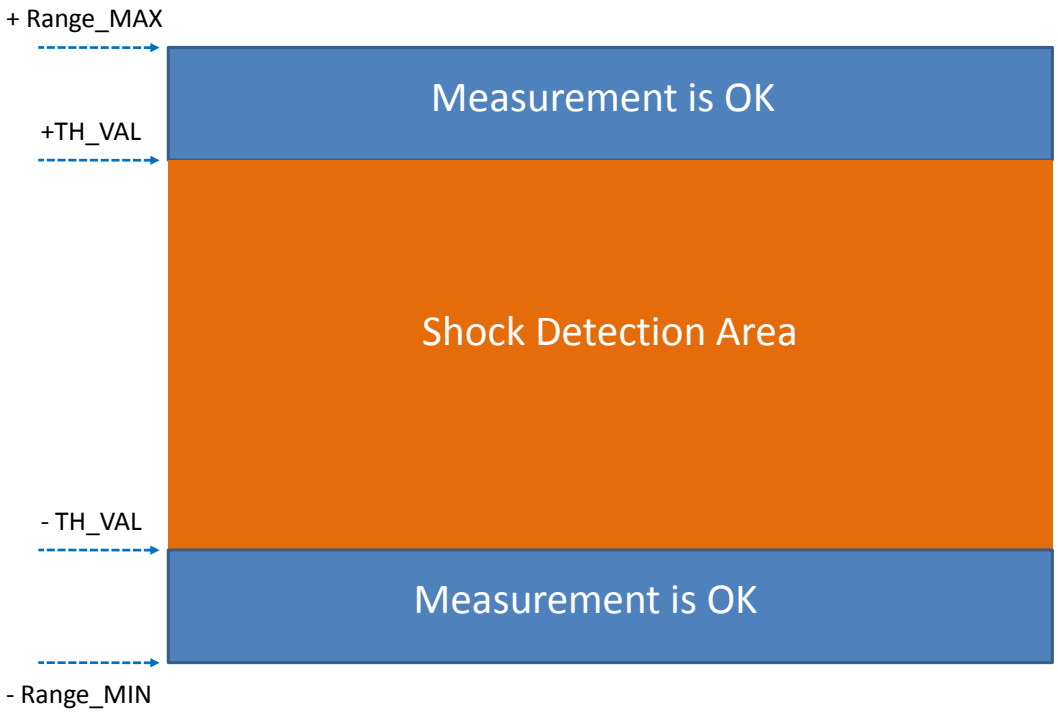
The user can associate a shock event with an axis: X Axis High, X Axis Low, Y Axis High, Y axis Low, Z Axis High, Z Axis Low.

The **AND/OR** combination is not available for two events on the same axis, i.e. the following combinations are not possible: X High **and/or** X Low, Y High **and/or** Y Low, Z High **and/or** Z Low.

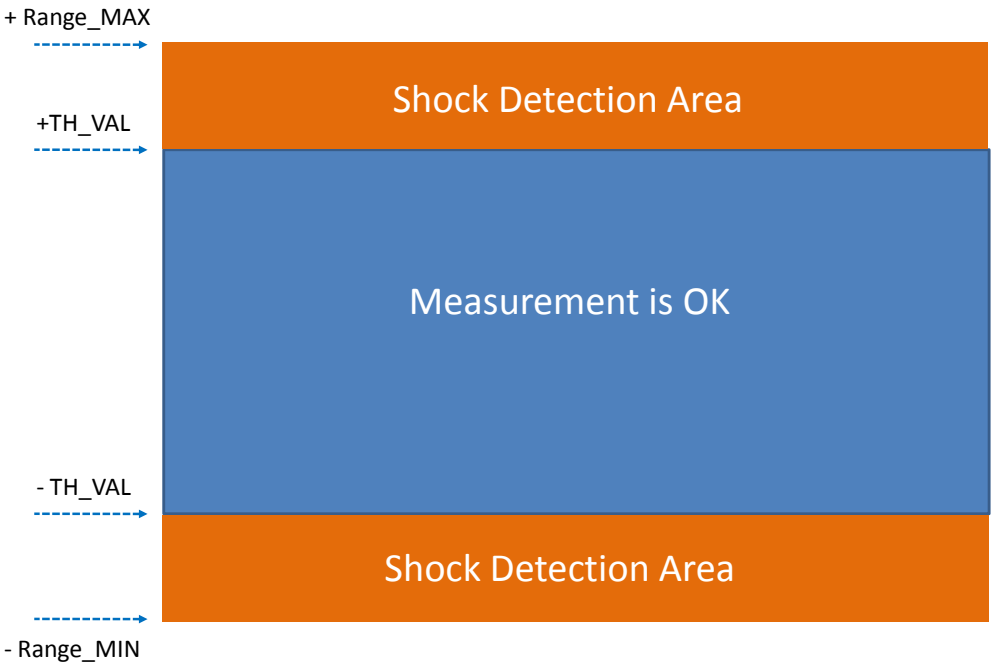
- ***TH_VALUE*** is the shock detection threshold settled by the user
- ***Range_MAX*** is the maximum measurement of the wireless accelerometer

<u>Several configuration of shock detection are possible on the same axis</u>:

- The user selects ***XX Axis Low,*** all the shocks events are detected on the following acceleration range [-TH_VALUE ;+TH_VALUE]



- The user selects XX Axis High , ***all the shocks are detected*** on the following acceleration range [Range_MIN ; -TH_VAL] and [+TH_VALUE; Range_MAX];



- The user selects a high event on the axis (+TH_VALUE), a shock is detected if the threshold value +TH_VALUE is reached:

6

Hysteresis

The user can fix an hysteresis on threshold value

Choose closely the value of the hysteresis.

The resolution depends on the accelerometer bandwidth during sleep or deep sleep.

7

VALIDATE

Click here to validate your new configuration

8

RESET

Click to restore a default configuration

9

CANCEL

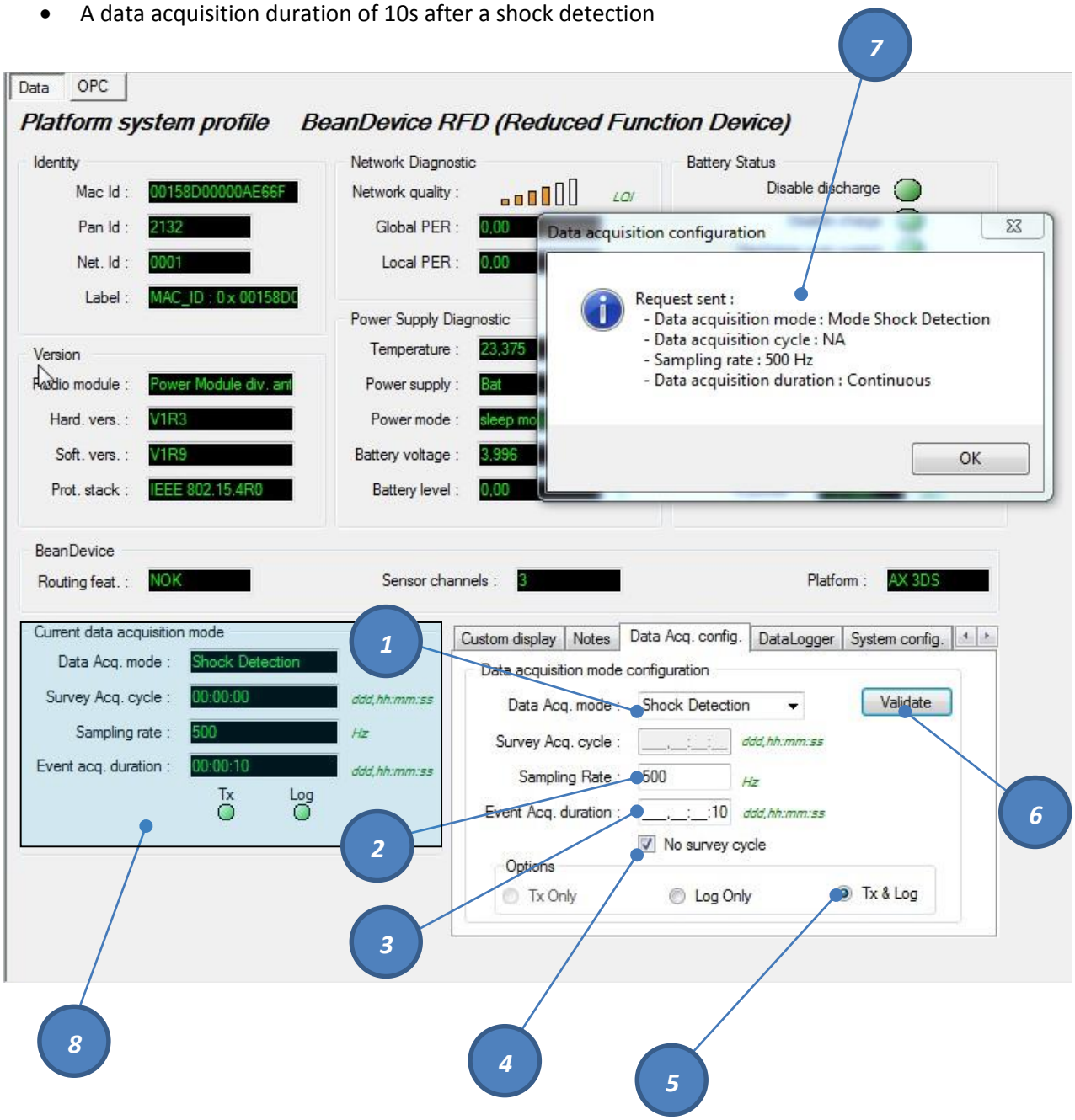
Click here to cancel your configuration

12.6.3 Step 3: Set SSD data acquisition mode

12.6.3.1 SSD with Survey option enabled.

Example: The ***Beandevice® AX-3DS*** should be configured as follow:

- SSD data acquisition mode,
- A sampling rate of 500 Hz after a shock detection,
- No survey
- A data acquisition duration of 10s after a shock detection



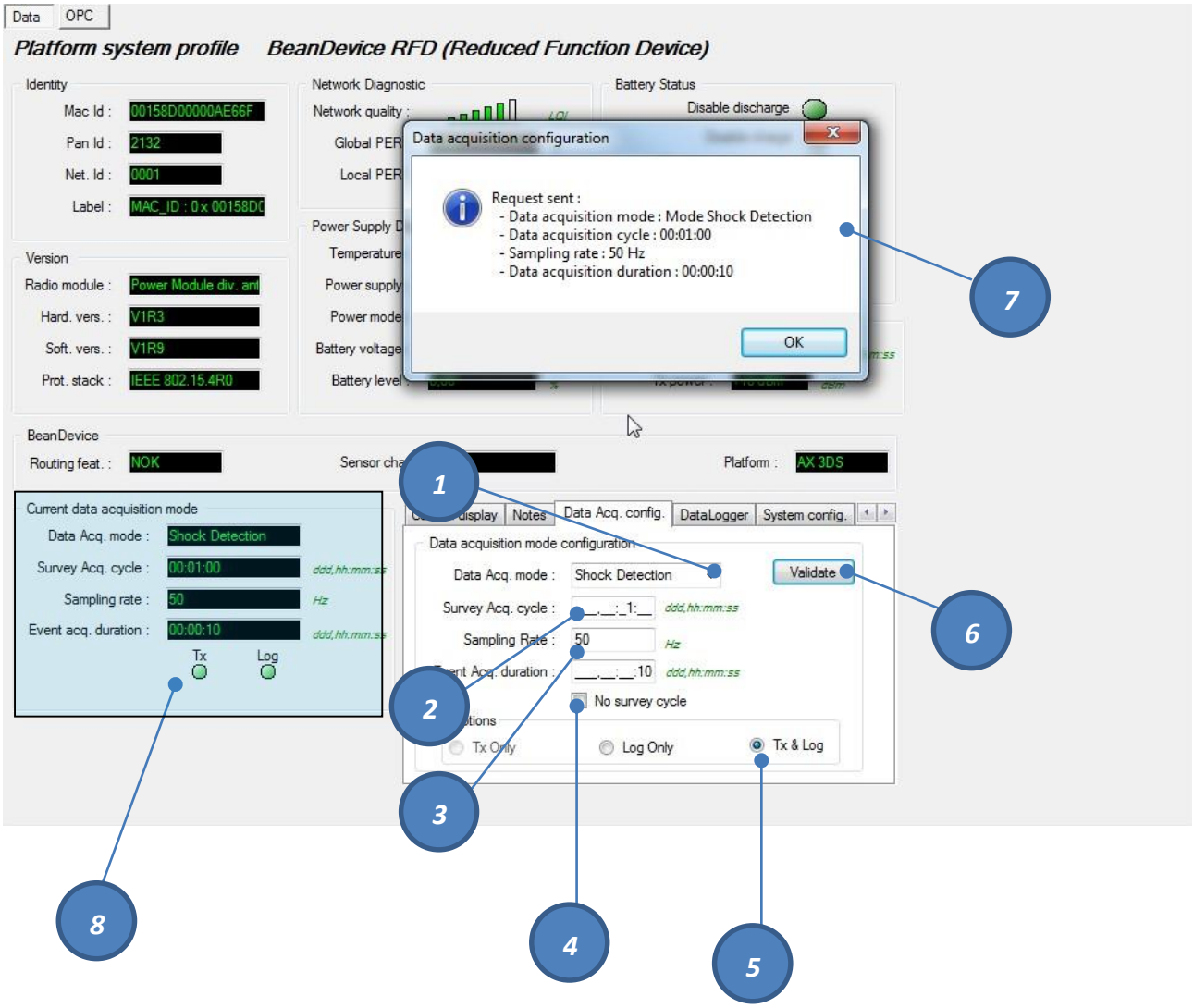
Proceed as follows:

1	*Choose "SSD" (Smart shock detection)*
2	*Enter a sampling rate of 500Hz during a shock event acquisition*
3	*Event acquisition duration: 10s*
4	*check "No survey cycle"*
5	*Choose the Datalogger option: here TX and Log*
6	*Click on validate to enable your new configuration*
7	*A Pop-up window displays the new configuration*
8	*If the new data acquisition mode configuration is accepted by the BeanDevice®, all the parameters are displayed in the frame "Current data acquisition mode"*

12.6.1 SSD data acquisition mode with a survey cycle

Ex: The Beandevice® should be configured as follow:

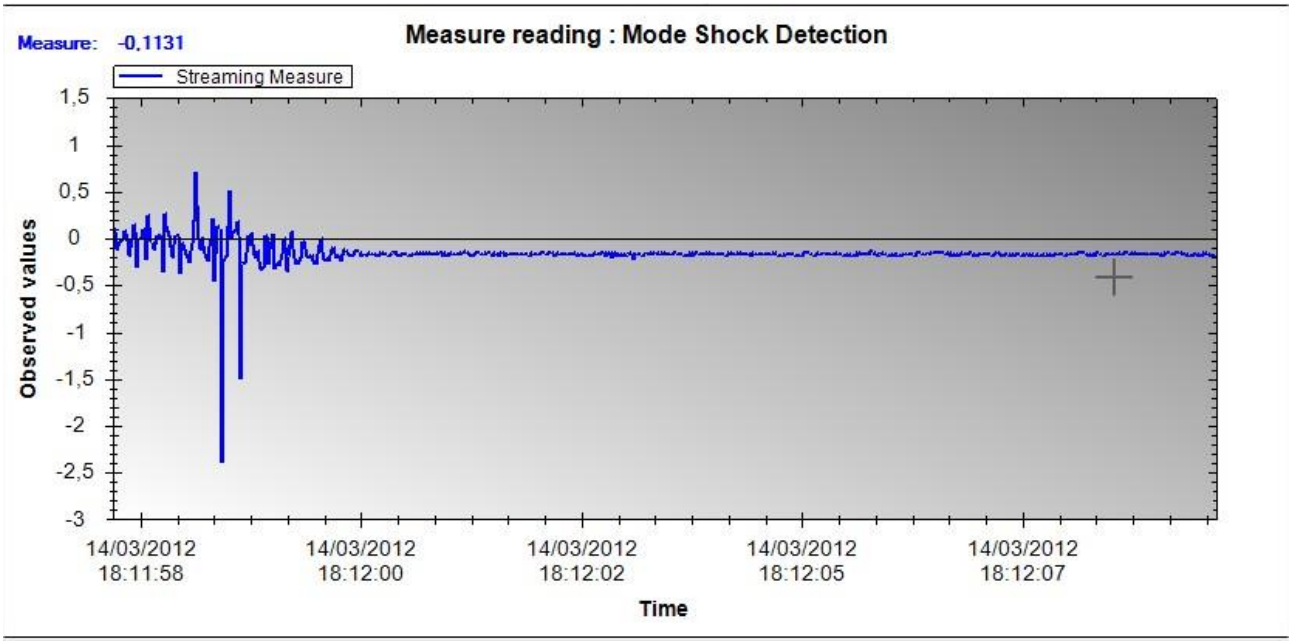
- SSD data acquisition mode,
- A sampling rate of 50 Hz after a shock detection,
- A survey cycle of 1 minute
- A data acquisition duration of 10s after a shock detection



1	*Choose "SSD" (Smart shock detection)*
2	*Enter a sampling rate of 50Hz during a shock event acquisition*
3	*Event acquisition duration: 10s*
4	*Uncheck "No survey cycle"*
5	*Choose the data logger option: here TX and Log*
6	*Click on validate to enable your new configuration*
7	*A Pop-up window displays the new configuration*
8	*If the new data acquisition mode configuration is accepted by the BeanDevice®, all the parameters are displayed in the frame "Current data acquisition mode"*

12.6.1 Graph display

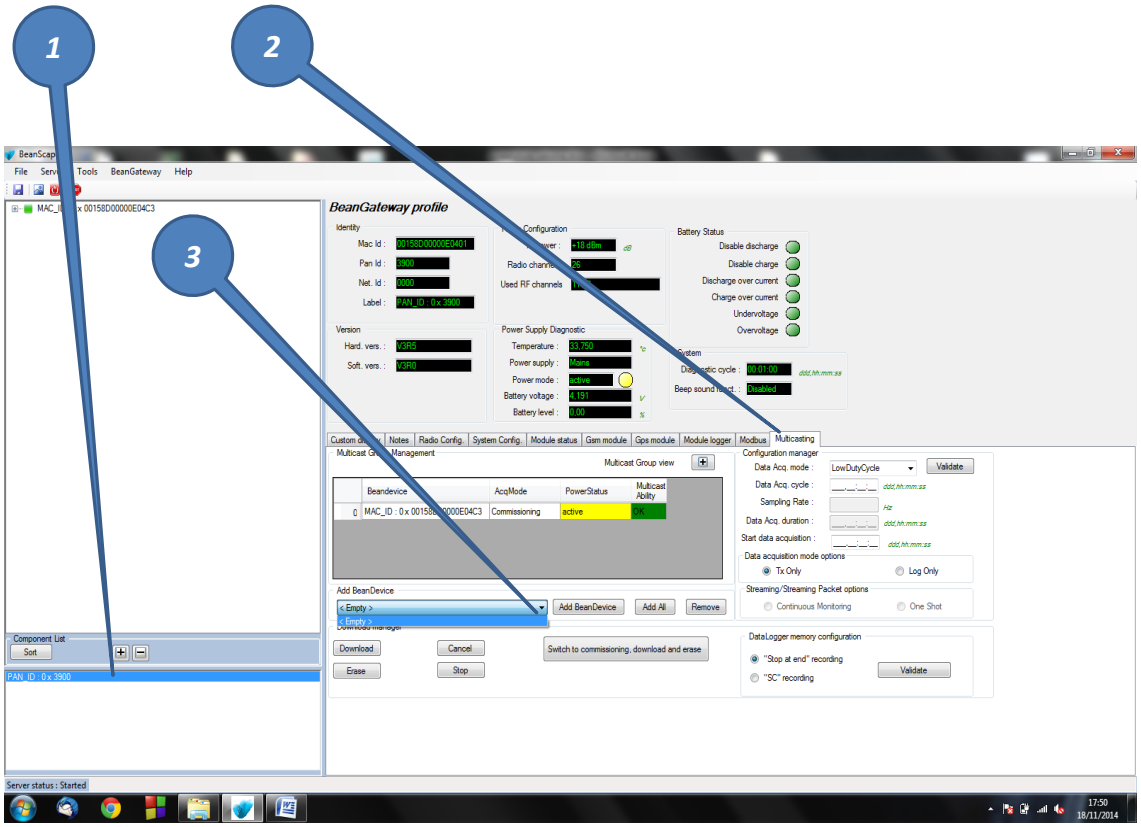
SSD data acquisition mode on the ***BeanDevice AX-3DS*** :



12.7 SYNCHRONUOUS MULTICASTING

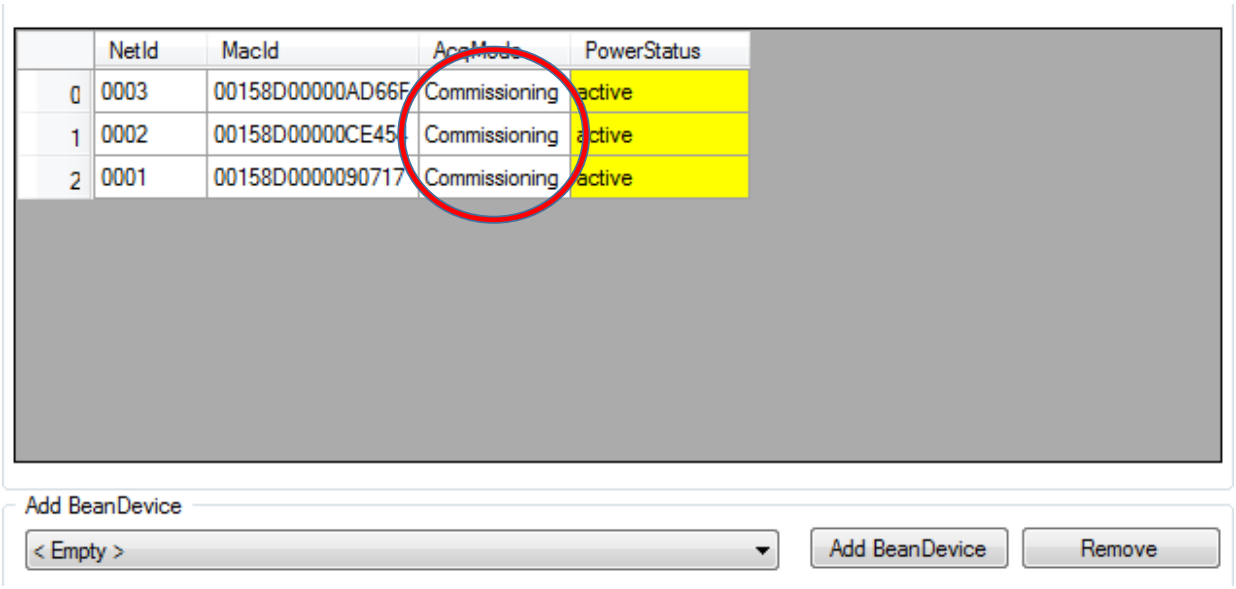
12.7.1 Step 1: Build your multicast group

1. Click on your BeanGateway® profile
2. Click on Multicasting Tab
3. Click on the scroll list and select the BeanDevice® which should be added to the Multicast group

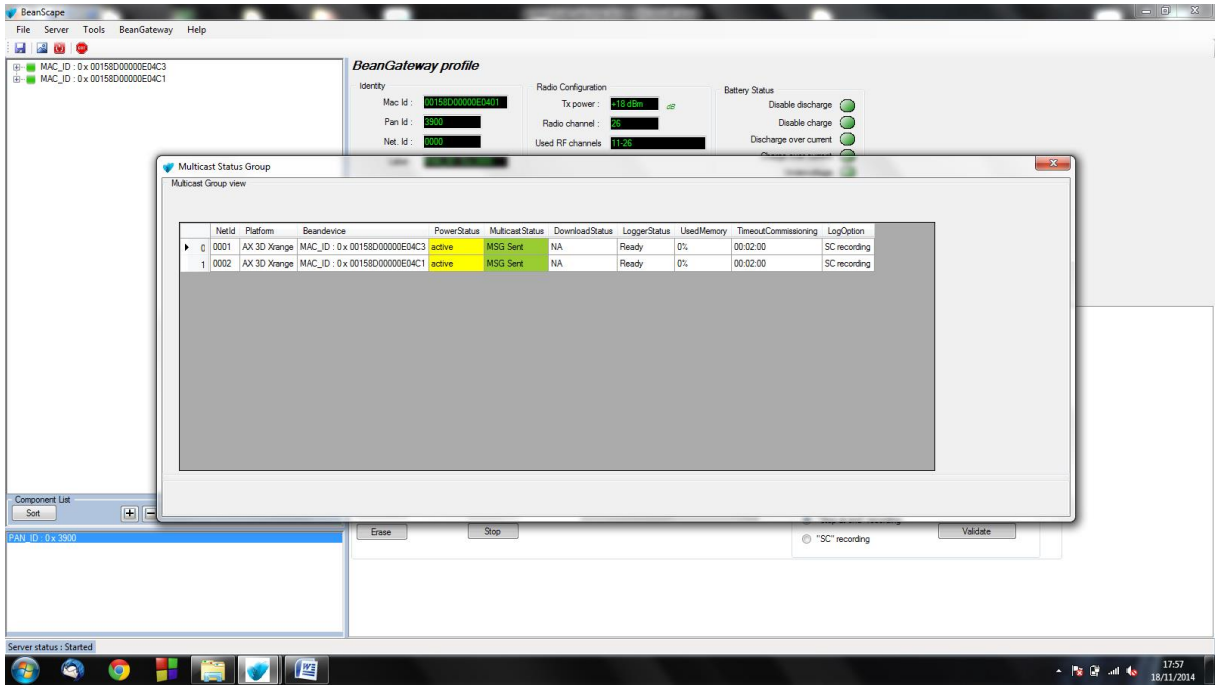


12.7.2 Step 2: Configure your BeanDevice® into "Commissionning mode"

Commissioning mode is displayed on all the BeanDevice® belonging to the same Multicast group.

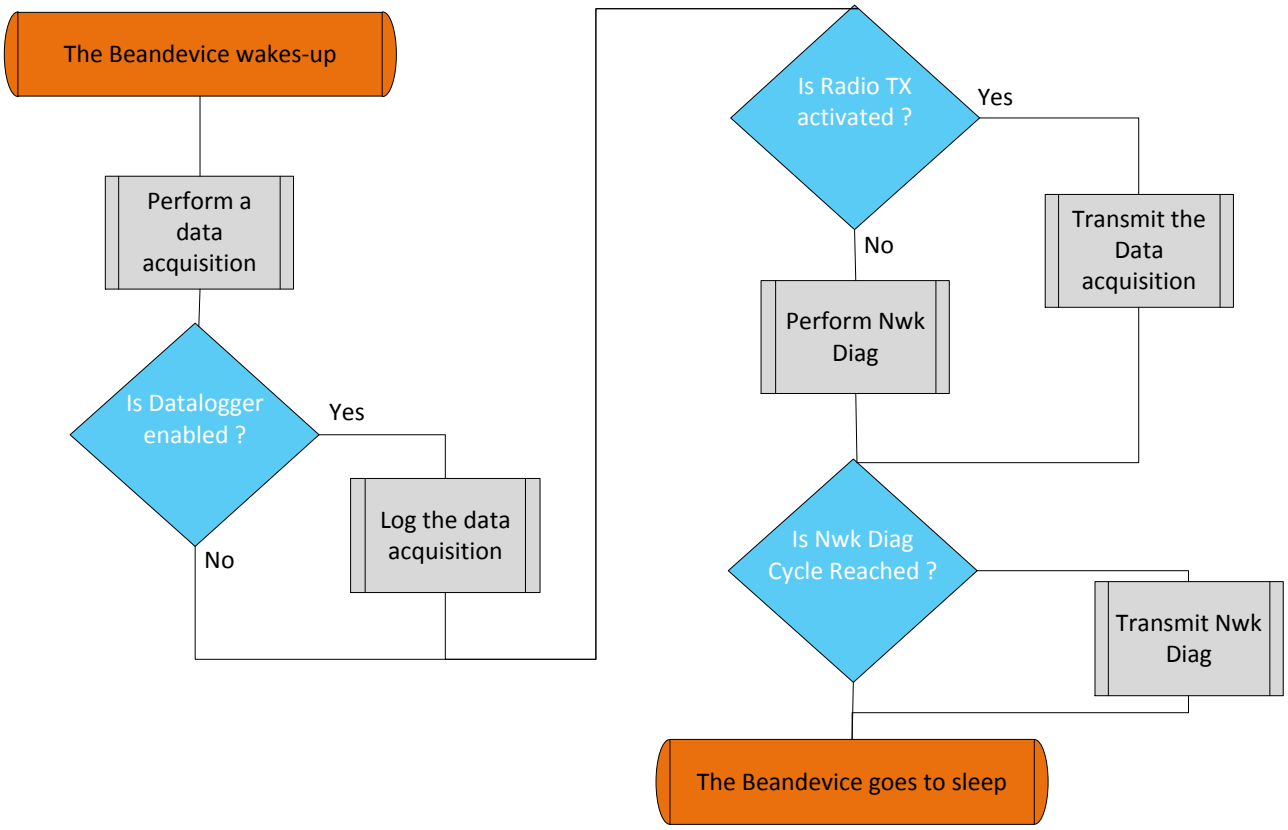


12.7.3 Step 3: Multicast a configuration to your Multicast group

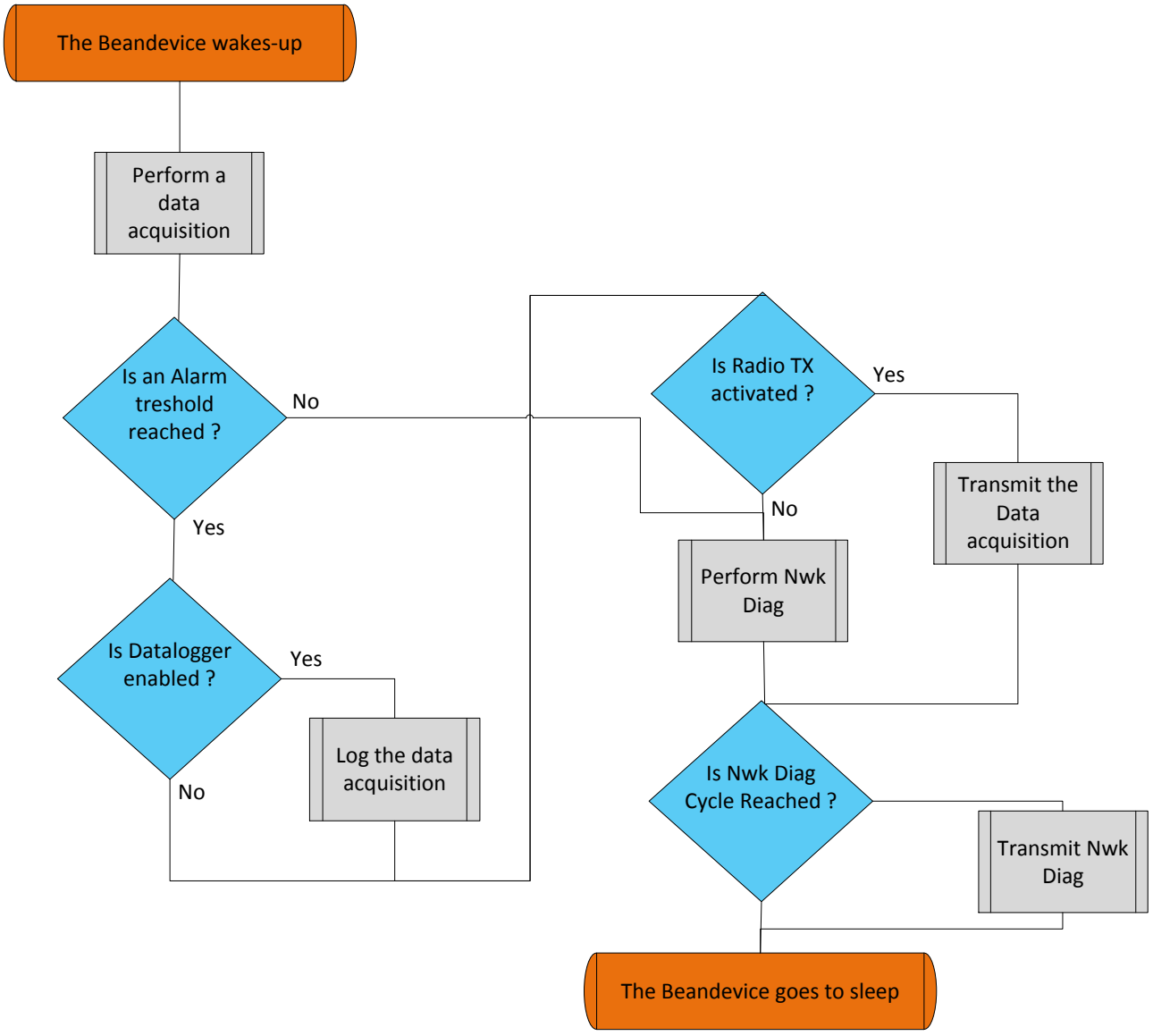


13. APPENDIX 1 : FLOWCHART DIAGRAM (FOR EXPERT USER ONLY)

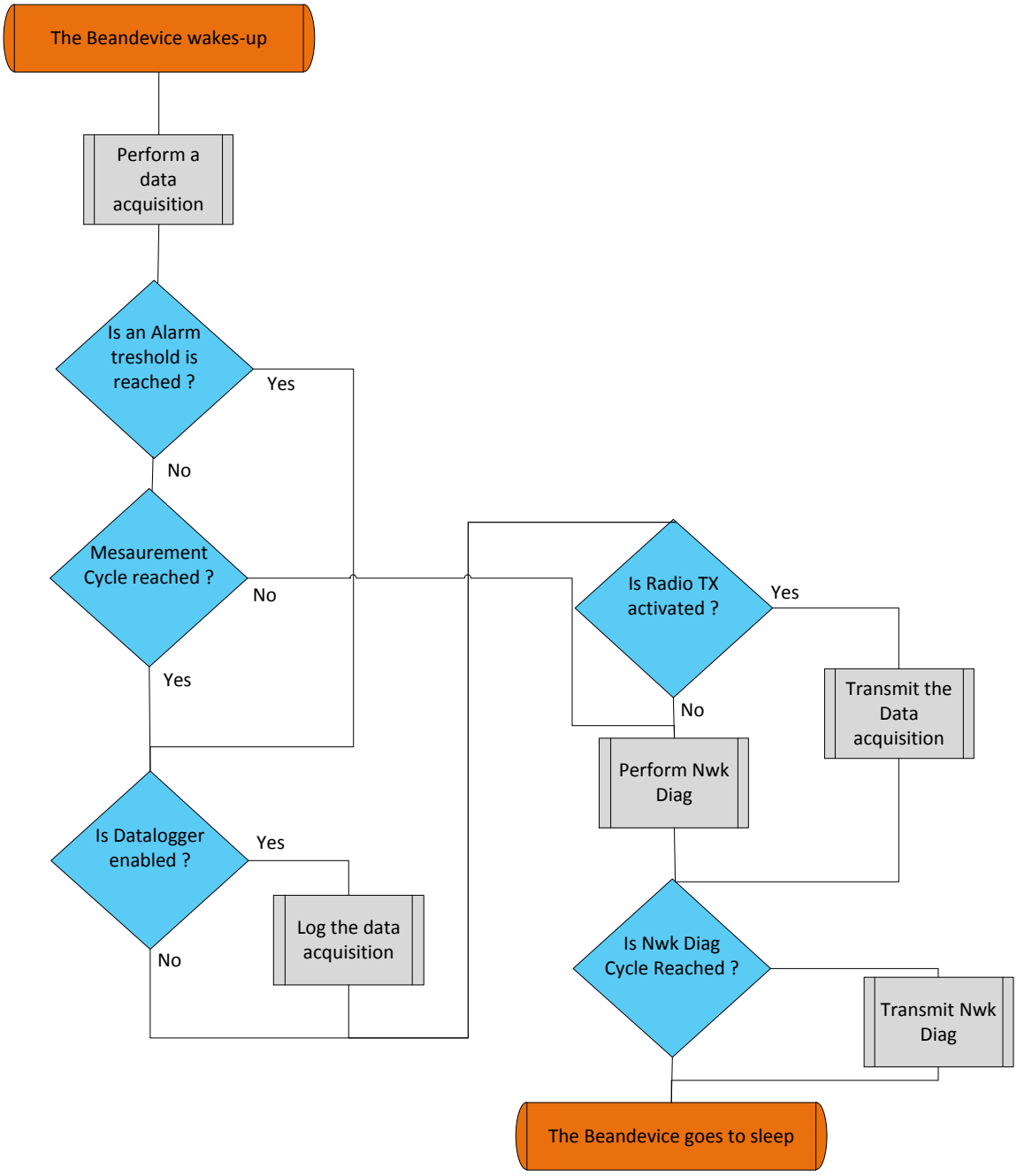
13.1 "LDCDA" DATA ACQUISITION MODE WITH SLEEPING POWER MANAGEMENT



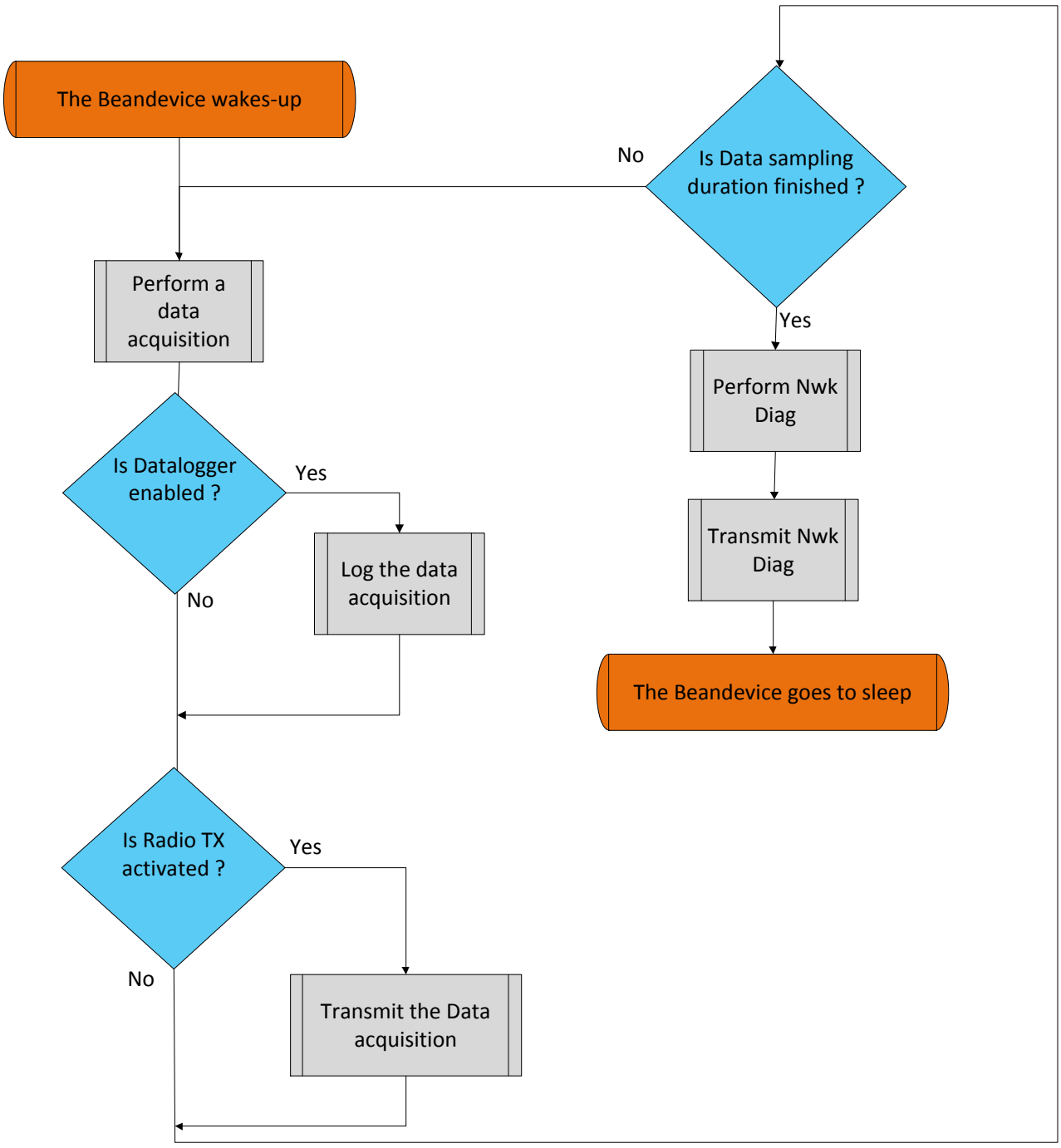
13.1 « ALARM » DATA ACQUISITION MODE WITH SLEEPING POWER MANAGEMENT



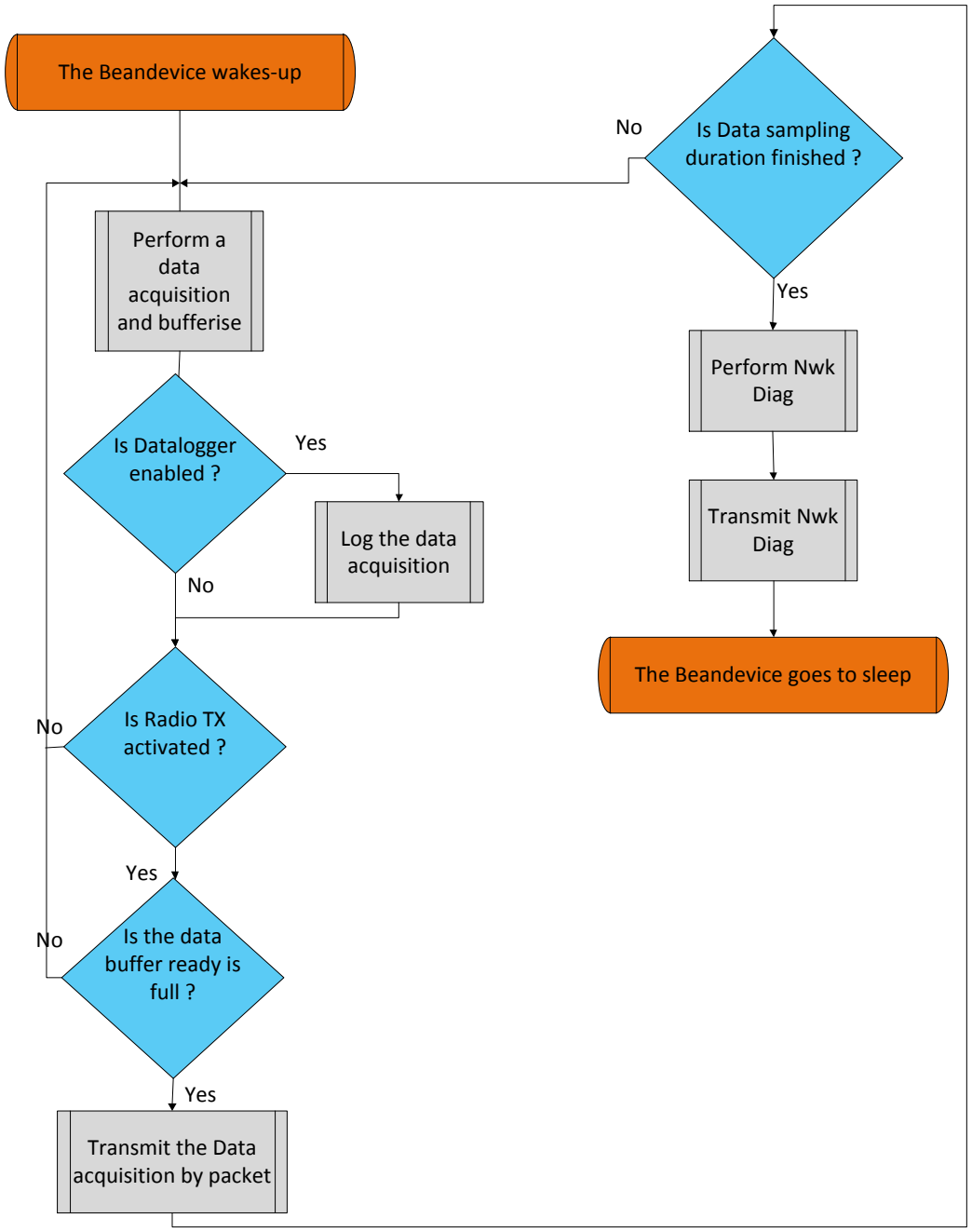
13.1 « SURVEY » DATA ACQUISITION MODE WITH SLEEPING POWER MANAGEMENT



13.1 « STREAMING » DATA ACQUISITION MODE WITH SLEEPING POWER MANAGEMENT

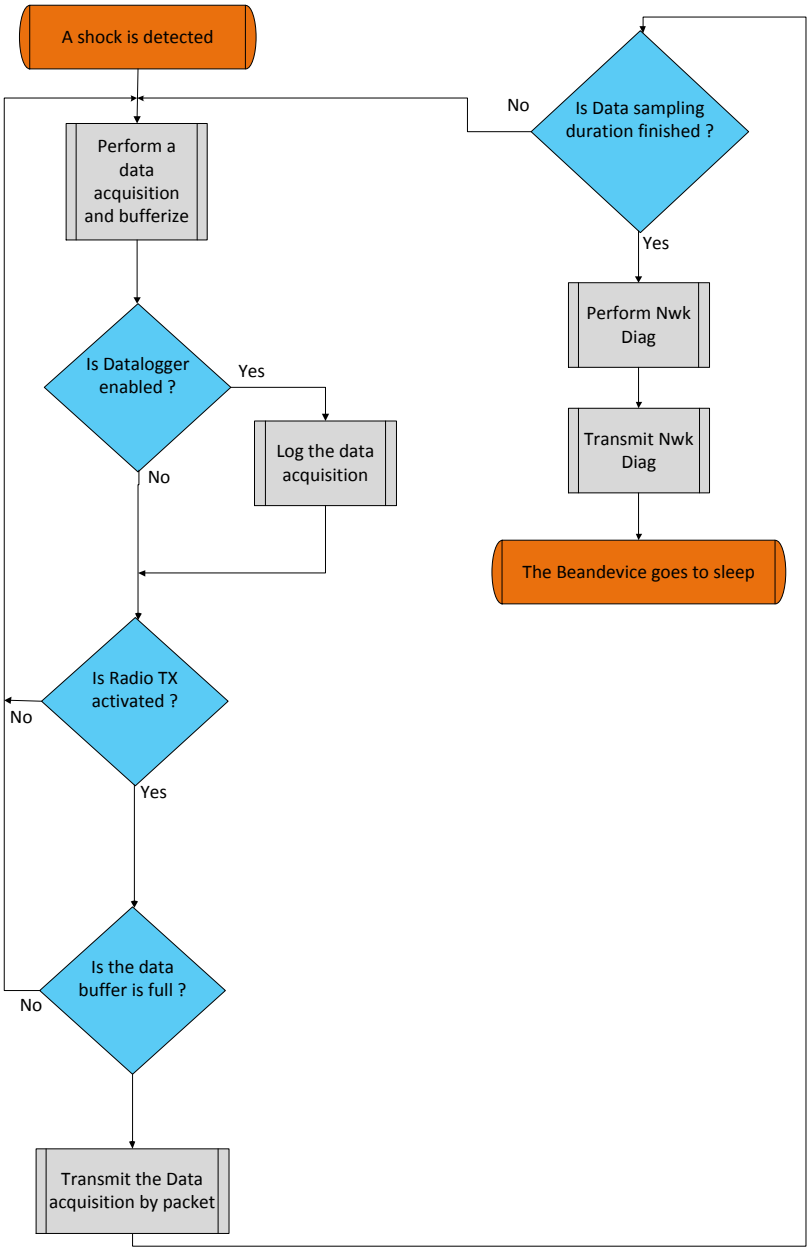


13.2 « STREAMING PACKET » DATA ACQUISITION MODE WITH SLEEPING POWER MANAGEMENT

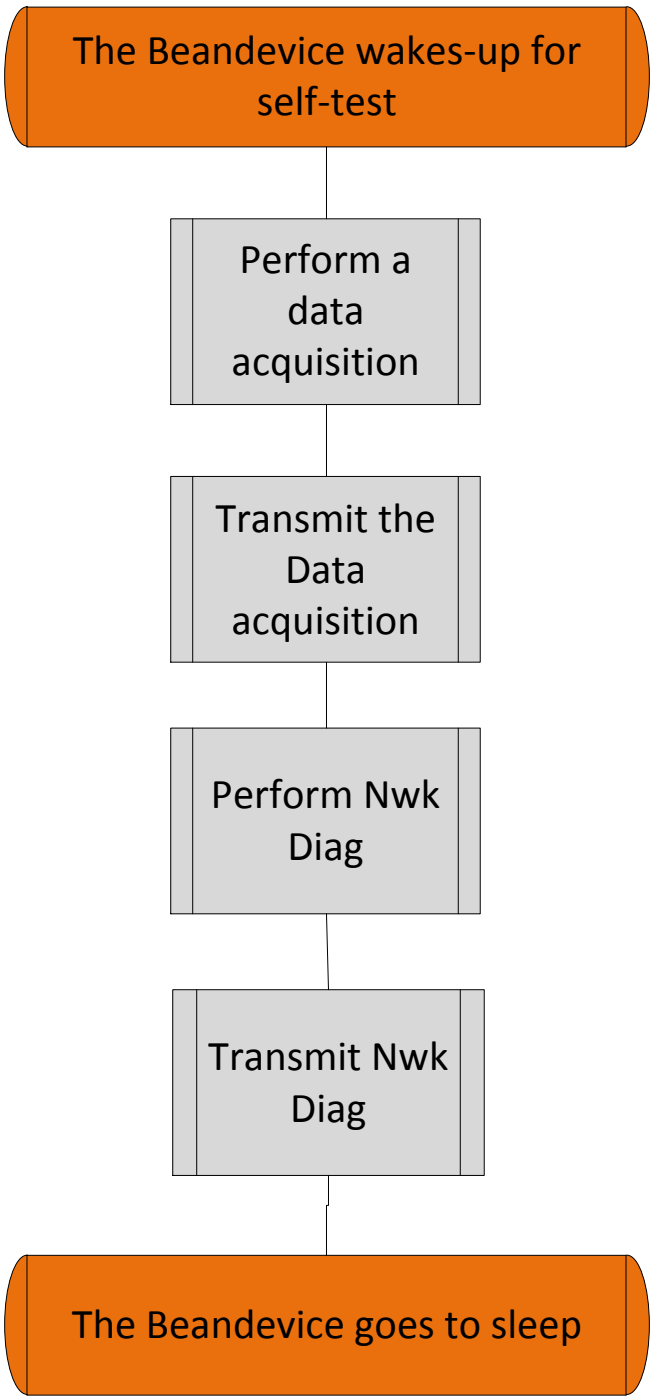


13.3 SSD (SMART SHOCK DETECTION)

13.3.1 Shock Detection Flowchart



13.3.1 Self-test Flowchart


The Beandevice wakes-up for self-test
Perform a data acquisition
Transmit the Data acquisition
Perform Nwk Diag
Transmit Nwk Diag
The Beandevice goes to sleep

14. APPENDIX 2 : HOW TO PREVENT A BEANSCAPE® CRASH

During a streaming or streaming packet data acquisition mode, your computer resources will be intensively used.

For avoiding a PC crash, the following steps should be followed :

- ✓ Disable Keep alive function on your computer and the BeanGateway®
- ✓ Disable the sleep mode of your computer & Ethernet board. For further information, please read the user manual of your computer.

14.1 DISABLE KEEP ALIVE FUNCTION

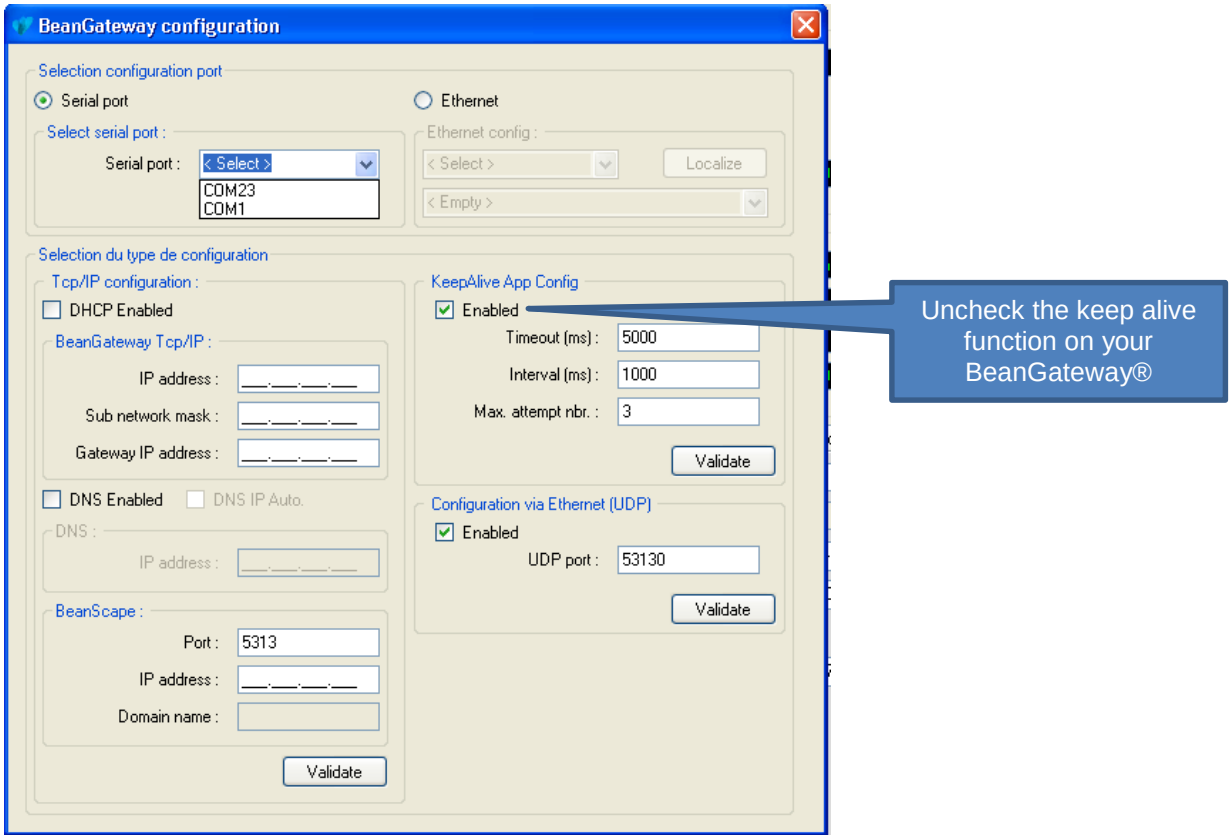
Keep alive message is exchanged between the BeanScape® and BeanGateway® to check that the link between the two is operating, or to prevent this link from being broken.

During a streaming or streaming packet mode, Keep alive message uses a low priority compared to the data acquisition message.

This link can be disconnected due to a high network activity.

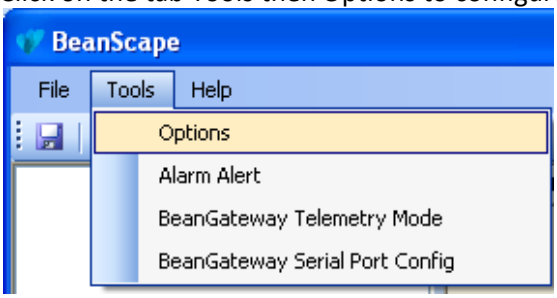
14.1.1 Disable the Keep Alive on your BeanGateway®

1. Go on your Beangateway® profile and click on **Tools**, then click on **BeanGateway® config**.
2. A new window will open called "**Beangateway® configuration**"
3. Disable the Keep alive available on your **BeanGateway®**

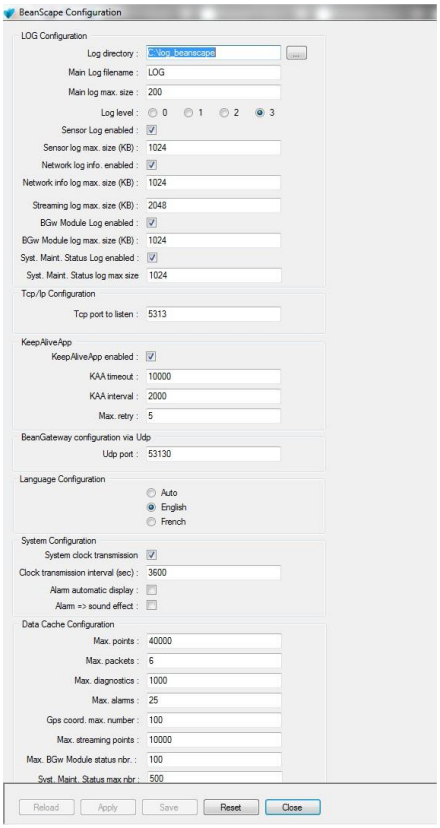


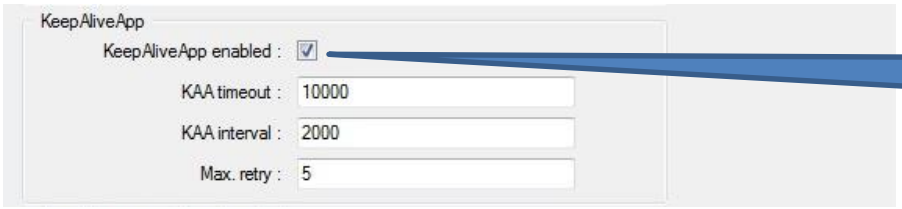
14.1.2 Disable the Keep alive on your BeanScape®

Click on the tab Tools then Options to configure advanced settings in ***BeanScape®***:



You will see the following window :


BeanScape Configuration
LOG Configuration
Log directory : C:\log_beanscape
Main Log filename : LOG
Main log max. size : 200
Log level : 0 1 2 3
Sensor Log enabled :
Sensor log max. size (KB) : 1024
Network log info. enabled :
Network info log max. size (KB) : 1024
Streaming log max. size (KB) : 2048
BGw Module Log enabled :
BGw Module log max. size (KB) : 1024
Syst. Maint. Status Log enabled :
Syst. Maint. Status log max size 1024
Tcp/Ip Configuration
Tcp port to listen : 5313
KeepAliveApp
KeepAliveApp enabled :
KAA timeout : 10000
KAA interval : 2000
Max. retry : 5
BeanGateway configuration via Udp
Udp port : 53130
Language Configuration
Auto
English
French
System Configuration
System clock transmission
Clock transmission interval (sec) : 3600
Alarm automatic display :
Alarm => sound effect :
Data Cache Configuration
Max. points : 40000
Max. packets : 6
Max. diagnostics : 1000
Max. alarms : 25
Gps coord. max. number : 100
Max. streaming points : 10000
Max. BGw Module status nbr. : 100
Syst. Maint. Status max nbr : 500
Reload
Apply
Save
Reset
Close



Uncheck the Keep alive function on your BeanScape® software